June 16, 1962
Vol. 162—No. 24

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

Charles E. Grauer, first recipient of the TELEPHONY scholarship for studies in telephone engineering, is graduating from Southern Technical Institute this month. He will join his father and brother in operating the Wilson (Kan.) Telephone Co. A second recipient of the scholarship will be chosen for the fall, 1962, term. See story on page 18.

Circulation This Issue
14,409 of Which
13,796 Is Paid

MANAGEMENT · PLANT · TRAFFIC · COMMERCIAL · LEGAL · ACCOUNTING

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9. C.O. calls are automatically disconnected when PBX phone hangs up, but turret attendant can block release and retain control of trunk, if desired.

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11. Consultation calls can be made while a PBX station holds a C.O. call—not only to another PBX line, but also to another C.O. party by using another trunk.

12. In an emergency the turret attendant can gain access to a busy line after a warning tone.

13. Restriction of selected phones to prevent outgoing calls does not prevent extending outgoing or incoming calls through turret attendant.

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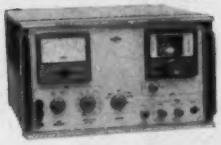

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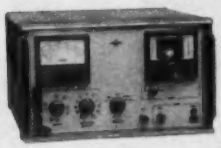

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FLASHES AND PLUGS

TOO GOOD TO BE TRUE—The best story around these days has to do with Mrs. Eleanor Zimmer and her son, Arno, a druggist.

Arno phoned a florist and asked him to deliver a geranium plant to his mother for Mother's day. The florist did, and Arno, seeing the plant for the first time, suggested that it looked a little dry and that perhaps she should water it.

Mrs. Zimmer did, careful not to wet the leaves or blossom, and the plant kept its color marvelously. She told her friends that she thought that it might even have more blossoms soon.

And then the cruel blow.

Her granddaughter, visiting Mrs. Zimmer, was fingering the plant.

"Don't touch the leaves!" cried Mrs. Zimmer.

"But grandma," protested the puzzled child. "It's artificial!"

And sure enough, it was.

•

ONE TRACK MINDS—Whenever the horses are running at Churchill Downs, the fever seems to hit almost everyone.

Rena M. Hamelfarb, a New Yorker who stopped in Louisville on business, called the hotel switchboard to inquire about the weather.

"It's going to be hot and rainy," the operator said, "You'd better pick a mudder."

•

TOO MANY SHOVELS—When a man and his wife both died, they took different routes to their destiny.

When the wife got to Heaven she immediately called her husband on the telephone: "How do you like it down there?" she asked.

"Fine," was his reply. "All we have to do is wear a red suit with horns, and every now and then shovel some coal on the fire. We don't work more than two hours a day. Tell me, how is it up there?"

"My goodness," said she, "we have to get up at four in the morning and gather in the stars, then we have to haul in the moon and hang out the sun. Then we have to roll the clouds around all day long."

"How come you have to work so hard?" asked the husband.

"Well, to tell the truth," said the wife, "we're short of help up here."—from Wisconsin Telephone Co. "News".

•

CALL WINS SURPRISE GIFT—In Milwaukee, Wis., a longtime resident of an apartment building telephoned her landlord that she recalled having moved in just 25 years ago. Being in a mellow mood, she invited him to drop by to help her celebrate this anniversary over a sociable libation.

The landlord did come to help celebrate the anniversary. He brought an anniversary card to mark the date, and enclosed with it was a receipt, marked paid, for his tenant's next month's rent!

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Please notify your local postmaster and the Circulation Department of TELEPHONY (608 S. Dearborn St., Chicago 5, Ill.) of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY

SINCE 1901

June 16, 1962

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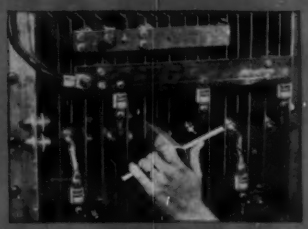
Front view, cover off, Model F400D50, showing convenient arrangement of input transformer, input taps, filter capacitors, fuses and saturating diodes.

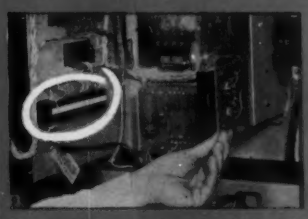
Front view showing meter panel hinged open to expose installer's terminals, input terminations and fuses, the plug-in reference circuit, the hinged component card and other components. All are directly accessible. Note the ample clearance around the input terminals and their proximity to the input bushing for safe and easy installation.

Model F400D50, rear view, cover off, showing accessible output terminals at the top. The silicon diodes with pigtail connections to the fuses, located between the heat sinks, are individually removable without disassembling the stack.



Detail view of power stack showing the compact arrangement of the silicon diodes and heat sinks. The diodes extend outwardly between sink plates and are quickly and easily removable, as shown, by means of a spark plug type wrench furnished with the unit. This arrangement allows diode replacement without disassembling the stack or removing it from the unit.

The meter panel, frame removed, showing the compact and central arrangement of the meters, operating switches, lamps, control breaker levers and adjusting screws. A complete control center.



The plug-in reference circuit card is removable, independent and interchangeable with the circuit in other Silicon FLOTROL models. Note the conveniently located installer's terminal strip and hinged component card, both to the left of the reference circuit card.

LORAIN *Products Corporation* LORAIN, OHIO

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SUB-CYCLE® CONVERTERS
FLOTROL® RECTIFIERS
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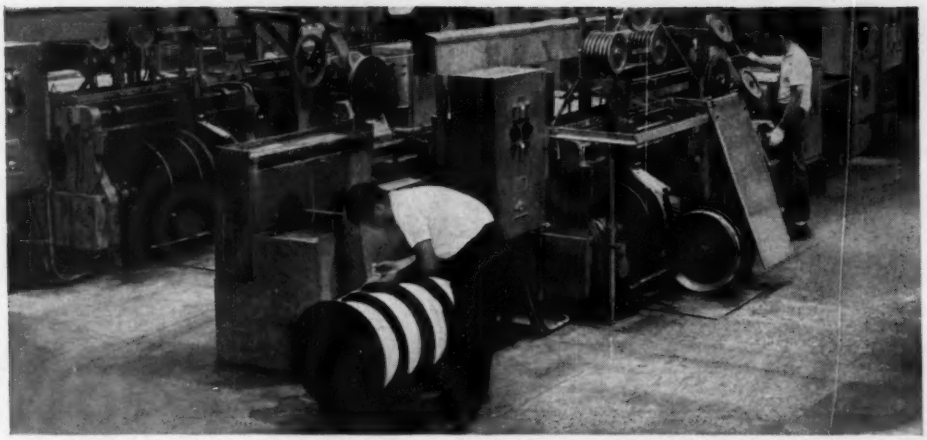
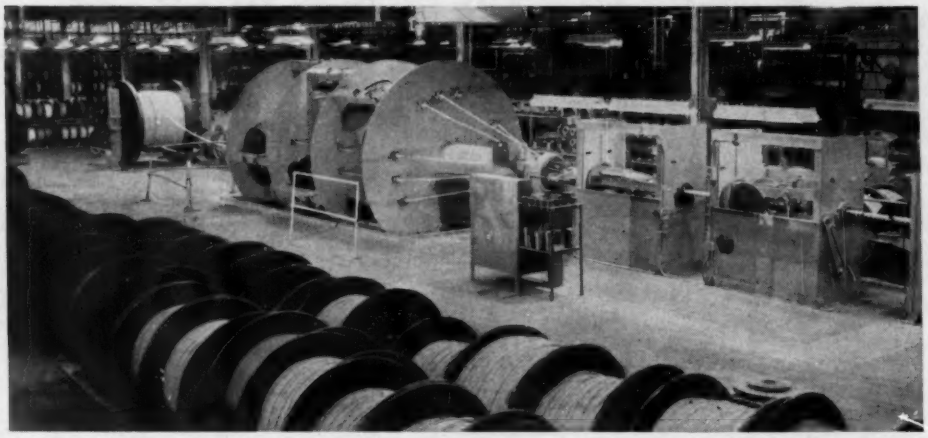
To assure complete in-service reliability, close control of quality is a necessity throughout the manufacture of telephone wire and cable. At Phelps Dodge, modern production machinery and equipment with automatic control devices are used to guarantee rigid quality standards. Additional checks made by teams of technicians include a final inspection of each wire and cable before shipment to its destination. This emphasis on quality control throughout fabrication provides important customer advantages—reduced maintenance costs and prolonged service life.

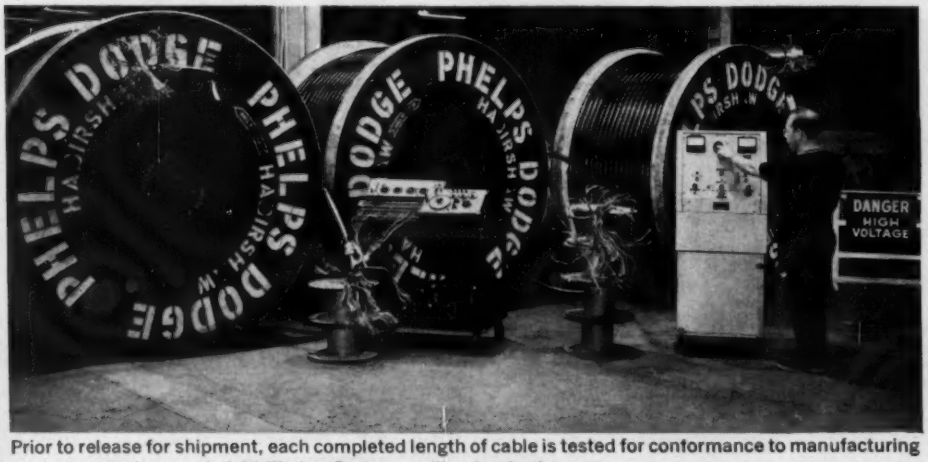
High speed stranding machines automatically control correct placement of varied lay pairs assuring maximum capacitance uniformity, a Phelps Dodge requirement.



Low loss polyethylene insulation is applied to individual conductors by a battery of modern extruders. Continuous diameter-gauge controllers are used to maintain maximum uniformity of insulation thickness.



In this cabling operation, fully color-coded basic units are channeled to predesignated locations, then spun into multi-unit cables.



Prior to release for shipment, each completed length of cable is tested for conformance to manufacturing control procedure and rigid Phelps Dodge quality standards.

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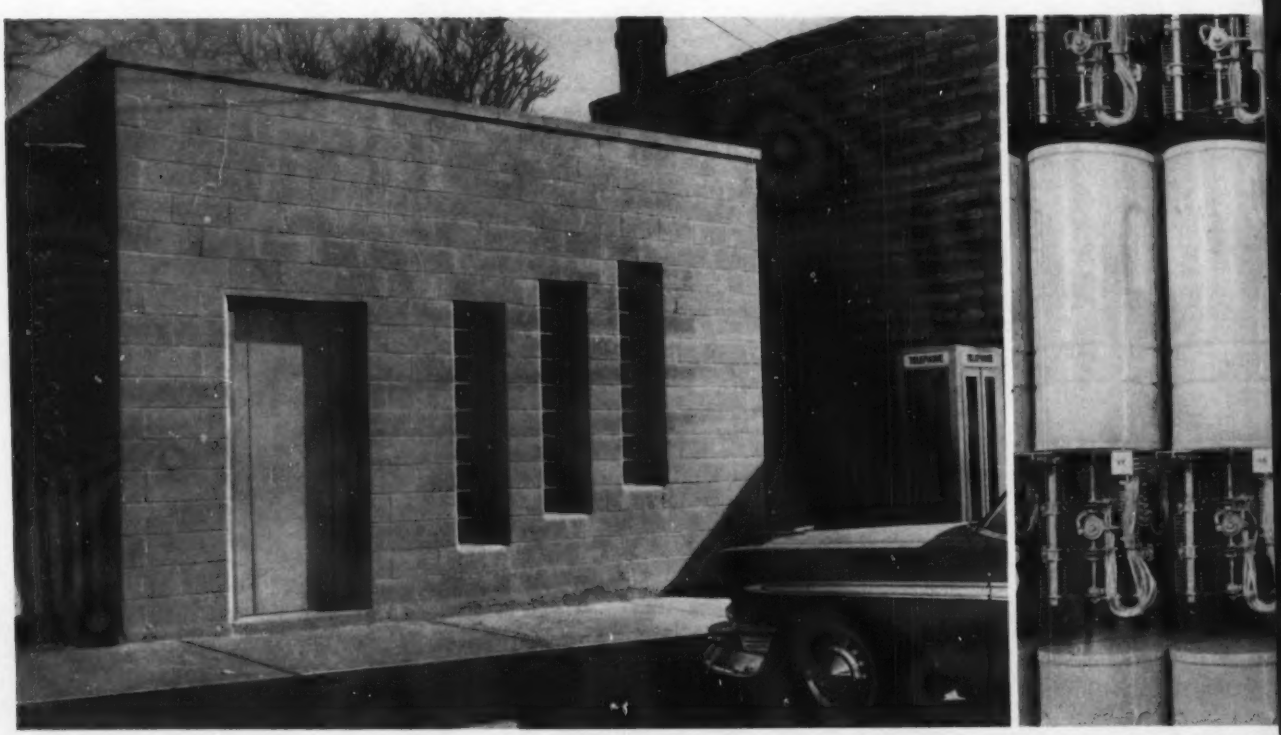
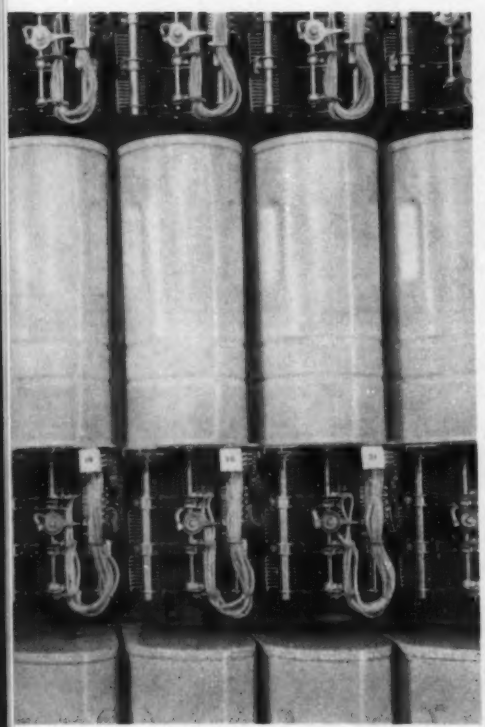
"We can expand to any size since converting 250 stations to AE dial"



reports P. T. Fritchen
MANAGER, FRITCHEN, INC.



P. T. FRITCHEN is probably the busiest man in Dorrance, Kansas (maybe in the United States). First, he's the civic-minded mayor of this farming community, which lies near the center of the nation. Second, he's an electrician by trade and does wiring for new buildings. Third, he manages Fritchen, Inc., the local telephone company. In this last capacity the versatile Mr. Fritchen recently took an important step: conversion of Dorrance to dial service.

The decision for dial conversion climaxed three years of advance preparation. Back in 1958, P. T. Fritchen began rebuilding his entire outside plant to accommodate dial. As he explains the situation: "Dorrance has had normal growth over the years and our service has remained efficient. In time, however, this continuing growth would obsolete our manual equipment and force us to go dial. And this time was not far off."

One factor helped expedite Fritchen's decision: the surrounding exchanges had converted. Mr. Fritchen visited some of these exchanges. He watched their dial equipment in operation. He saw figures on their improved earnings, increased traffic and lower operating costs since conversion. "In many of these exchanges," says Mr. Fritchen, "I found telephone men wishing they had converted to dial years sooner."

During the years of rebuilding his outside plant, P. T. Fritchen met with AE representative, Gerald Miller. Gerald's experience in the field proved helpful in discussing dial conversion problems. The outcome of these discussions: AE dial was selected. "I'd say the main reason for choosing AE dial equipment," remarked P. T. Fritchen, "was keeping up with community growth. With AE, we can expand to any size easily and economically. Also, AE gives you unlimited trunking range and simple construction which insures low maintenance."

Gerald Miller surveyed Fritchen's daily traffic volume. A projection of these figures gave a good estimate of Dorrance's traffic volume in the near future.

Conversion to dial is a major capital investment, which means financing is a vital consideration. P. T. Fritchen met with Gerald Miller and George Summerscales, AE district manager, to arrange a $30,000 loan under the AE Finance Plan.

A new exchange building was planned for Fritchen's conversion. Here, the important factors are economy in cost and maintenance, plus a pleasing appearance. Exchange buildings are difficult to design since efficient equipment layouts often violate architectural concepts of mass and form. Fritchen's new building was an example of harmonious design and efficiency. The architects name: P. T. Fritchen. His design took in future growth and changes, air moisture content, adequate aisle space. Even lighting was planned for proper intensity.

AE specialists supervised the installation of Fritchen's dial equipment. They helped assign new numbers for the community and assisted in preparing a directory. A new fire-reporting system was worked out by Gerald Miller and fire officials. It put 10 stations on a common fire-reporting line, which was not connected to line equipment. The system gives faster service and eliminates delay during emergencies.

In December, 1961, Fritchen, Inc. converted to AE dial. Today, it serves 250 stations over a 180 mile area. Since conversion, three operators have been released and three toll trunks put in service to Russell, Kansas. "Folks are really enthusiastic about dial service," observed P. T. Fritchen. "Thanks to AE dial, they're getting better service and we're selling more services." *P.S.* Thanks to AE dial, P. T. Fritchen will probably be re-elected mayor.

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- Measures % break of send and receive pulses
- Single scale meter through internal switching
- Loop or E+M operation
- Dial and Talk functions
- E+M supervisory lamps
- On Hook and Off Hook provisions
- Transistorized oscillator circuits
- 48-Volt DC operation
- Operates in horizontal and vertical positions

Dial pulsing problems are a major factor of complaints in failures to complete calls or reaching wrong numbers. The increasing use of DDD is bringing greater recognition of the need for minimizing dial pulse distortion.

The *Model TTS 26A* is a pulse signaling test set designed to aid in tracking down the sources of trouble in signaling systems. It may be used in central offices, at PBX's, or on subscribers' instruments to generate calibrated signals and also to measure the % break of dial pulses.

It is designed to either send pulses generated by a built-in oscillator or pulses obtained from an external dial; the % break of the transmitted pulses can be varied over a wide range and can readily be measured. In addition, the set measures the % break of pulses received in the circuits to which the set is connected. Signals can be received or transmitted on a Loop or E+M basis.

The instrument can be operated from a power source of 48 volts DC or an external 45-volt dry battery. It can be used in a vertical or horizontal position. A detachable cover includes storage space for cords, small tools, and other items.

The Model TTS 26A consists of an internal pulse generating circuit, provisions for sending signals obtained from an external dial, and a measuring circuit designed to measure the % break of the send pulses generated by the instrument or the receive pulses on the circuit under test. Controls are provided for switching different functions and modes of operation and to calibrate the instrument to eliminate the effects of battery voltage variations.

Other instruments available from Northeast Electronics Corporation include Transmission Test Equipment, Single Frequency and Multi-Frequency Reference Tone Generators, Loop Around Transmission Test Systems, Fault Locator, Singing Point Test Set, Program Amplifiers, and RF Power Monitors.

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EDITORIAL

Private Enterprise vs Government Ownership

Satellite Bill Faces Test in Senate

A TELEPHONE industry executive has shot a big hole in the argument that the federal government has spent millions more on research and development of communications satellites than private communications companies.

This has been the argument of government ownership advocates, including certain U. S. senators, who are opposed to private ownership and operation of the communications satellite system as proposed in a bill now before Congress.

They hold that private enterprise, especially AT&T, will be given virtually, free of charge, the benefit of the federal government's research in space communications, if the bill to create a private corporation to own and operate the satellite system becomes law.

The bill has already passed the House by a vote of 354 to 9 and it will be reported to the Senate for action soon.

A group of senators is reported to be ready to make a stand against passage of the bill. The group reportedly includes Senators Wayne Morse and Maurine Neuberger of Oregon; Ralph W. Yarborough of Texas; Albert Gore and Estes Kefauver of Tennessee; Russell B. Long of Louisiana: Quentin Burdick of North Dakota, and Ernest Gruening of Alaska.

Refuting the claim of these senators and various advocates of public ownership that the government has spent more on satellite research and development than private communications companies, James E. Dingman, executive vice president of the American Telephone & Telegraph Co., in a recent letter to Senator Magnuson (D., Wash.), said the Bell System has expended more than a billion dollars in "research and development in fields closely pertinent to today's satellite communications system development."

Mr. Dingman also pointed out that the Bell System, thus far, has spent more than 45 million dollars that are directly allocable to the system's own Telstar experimental satellite project and the provision of a ground station at Andover, Me. Considerable more will be required to complete the project, he said. In addition to this cost, AT&T will pay the government 3 million dollars for use of its launching facilities to put each Telstar in orbit, regardless of whether or not the launching is successful.

Mr. Dingman listed six basic components that have been researched and developed by the Bell System, which make a communications satellite system possible. These components, with the year each was developed, are: The transistor (1948), the solar battery (1954), the traveling wave tube (1943), the maser (1957), the wave guide (1920's), and the horn reflector antenna (1930's).

Mr. Dingman also told Senator Magnuson that many other companies have also contributed, through research and development programs, to the existing pool of relevant scientific knowledge.

We don't know what the federal government has spent on research and development of communications satellites, but we've seen one figure of 473 million dollars quoted by a liberal newspaper columnist. We don't know if this figure is correct or not, but if it is, the expenditure of private enterprise dwarfs the government's outlay.

It is our opinion that the senators referred to above are not too much concerned about who spends what for the development of the communications satellite system. We believe they have brought up the government's purported cost figure purely as a smoke screen, from behind which they can launch an attack on what seems to have been their favorite target for a long time—private enterprise.

These senators, and possibly others, are sure to wax hot and heavy for government ownership of the satellite system in prolonged debate when the bill comes to the floor of the Senate, in hopes of defeating it or talking it to its death.

We think it is again time for telephone people to take up their pens in defense of private enterprise in their industry. As we said in our editorial in the Mar. 31 issue—they should write their senators and demand a continuation of private ownership in American international communications services which have been so successful up to now.

As for us, we'll repeat once more what we have said in the past: "We don't want Uncle Sam in the telephone business or any communications business. We don't ever want his foot in the door. The United States has the best and most telephone service in the world only because it was developed first and last as a private enterprise system."

IN THE NATION'S CAPITAL

BY LAWRENCE J. HOGAN, WASHINGTON EDITOR
and President, Larry Hogan Associates,
Public Relations Firm.

Senator Hickenlooper offers amendment providing stiffer penalty on foreign countries expropriating American-owned properties . . . . Several representatives request telephone excise tax be eliminated, but bill to continue excises receives same treatment it has received in past—discussion and passage . . . . Southern Bell in law suit over Memphis franchise tax.

SEN. BOURKE B. Hickenlooper (R., Iowa) on June 7 offered an amendment to the Foreign Assistance Act of 1961 which could cause Latin American countries to take a longer look before they expropriate American properties. The Senate has already adopted an amendment providing that in any case in which the President determines that a nation or political subdivision thereof has expropriated or otherwise seized property of Americans, unless it sets up the proper machinery to accomplish the payment for the property so seized, it cannot obtain any help from our foreign assistance program until such payment is made.

Hickenlooper said, "The amendment provides for such prohibition in any case hereafter in which the President determines that a nation or political subdivision thereof has expropriated such property. I propose to have the language read 'has expropriated after Jan. 1, 1962'—in other words, last January."

The Iowa senator stated he believed this action is necessary because three expropriations which are going on in the world have taken place since Jan. 1, 1962—two in Brazil and one in Ceylon.

"If we do not do something to stop that kind of nonsense or to see that payment is made for property when it is seized, we shall see a wave of expropriations of property of Americans going throughout the world like a prairie fire.

Hickenlooper had printed in the record the decree of the expropriation program issued by Brazil last May 30, in which Brazil established the formula for taking over foreign property in that country " . . . with an indefinite, undetermined and certainly unsatisfactory method for paying for the property. . . ."

Hickenlooper pointed out that the introductory paragraph of the Brazilian release indicated that the new decree has the approval of the United States Government. He said he strongly doubted this and called upon the State Department either to confirm or deny it.

Referring specifically to the Brazilian decree, Hickenlooper had Article 2 printed in the record as follows:

> The conditions governing refund or indemnization agreed upon with the concessionaries shall be subject to the following principles:
>
> (a) Initial payment of a portion not to exceed 10 per cent of the agreed total;
>
> (b) Deferred payment of a portion to installments compatible whenever possible with resources accumulated by the selfsame utility and with a minimum of additional public resources;
>
> (c) Obligation assumed by the concessionaries to reinvest in the country, in sectors or activities defined by the National Planning Commission as enjoying priority for social and economic development, of not less than 75 per cent of the net amounts received as reimbursement or indemnization, such reimbursement not to be applied to the financing of, or participation in, any Brazilian enterprise already in operation.

He then said, "Article I provides for the setting up of a commission to recommend to the council of ministers what utilities shall be taken over and to negotiate the amount of the indemnification. Article 3 provides for expert evaluation and/or arbitration and in the event of disagreement for ultimate decision by the President or the council of ministers with the approval of the Cabinet.

"My purpose is to comment on Article 2, which falls far short of the standard of prompt, adequate, and effective compensation. It is deficient in the following respects. First, in that the initial payment may not exceed 10 per cent. Second, the remaining 90 per cent or more is to be paid in installments 'compatible whenever possible' with the earnings of the utility. This suggests that the payment of the balance of the amount owing to the former owners will be dependent on the earnings of the utility.

"It is a notorious fact that most of the utilities in Brazil, which are foreign owned, have been losing money because their rates have been controlled at too low a level to permit a profit. In the case of the ITT subsidiary, the company has lost money for the last 10 years. If Article 2 of the Brazilian decree means that installment payments will be dependent on the earnings of the company seized, the decree is subject to precisely the same objection as the State Department officially made to the Castro decree, which provided that payments would be made from the proceeds of sales of sugar to the United States.

"Third," he continued, "it appears that the new Brazilian decree would sanction the issuance of long-term bonds, a device which Castro included in his decree of July 6, 1960, and which was condemned by the State

Department in its release of July 16, 1960. Fourth, the Brazilian decree definitely would require the former owners to reinvest 75 per cent of the net amounts received, including presumably the amounts received in the initial down-payment of not to exceed 10 per cent, in enterprises in Brazil selected by the Brazilian Government. This does not meet the international law standard that compensation be effective. To be effective, it must be in a form which the former owners can use freely wherever they see fit to do so. Furthermore, what is to protect the former owner against the fantastic inflationary losses which would occur while it is seeking the approval of the Brazilian Government for a new investment in Brazil?"

Hickenlooper went on to say that in many areas of the world, and especially in Latin America, the argument is being used that "if Cuba got away with seizing American property, why cannot other countries get away with it?"

Said the Iowa senator, "If they get away with it, the sanctity and security of Americans' investments in Latin America are done and over with."

Senator Hickenlooper and his colleagues who have expressed concern over the callous investigation of American properties are certainly to be congratulated.

We are glad to see that the amendment was agreed to.

Extension of Excise Taxes

Discussion in the House of Representatives on June 6 in regard to the bill (H.R. 11879) providing a one-year extension of the existing corporate normal-tax rates and of certain excise-tax rates occurred, befittingly enough, immediately after Treasury Secretary Dillon revealed that the Kennedy administration will call for an income tax reduction next year.

The excise taxes in question, of course, are those levied on distilled spirits, beer, wine, cigarettes, passenger cars, automobile parts and accessories, transportation and general telephone service. All of the taxes affected by the bill, except those relating to general telephone service and transportations of persons, are taxes which were increased during the Korean War.

In light of the administration's announcements that it is toying with reducing taxes, a number of objections were voiced to extending the bill.

Among the leaders was the scrappy and outspoken Rep. H. R. Gross (R., Ia.), whose eagle eye perennially scans every cent Congress wants to spend.

Convention Calendar

1962

Association	*Date*	*City*	*Hotel*
Washington-Oregon*	**June 21 and 22**	**Portland, Ore.**	**Sheraton-Portland**
Alaska	**Aug. 19, 20, 21**	**Haines**	
Tennessee	**Sept. 5 and 6**	**Nashville**	**Hermitage Hotel**
Arkansas	**Sept. 10 and 11**	**Hot Springs**	**Arlington Hotel**
Nevada	**Sept. 11, 12 and 13**	**Sparks**	**Sparks Nugget**
Georgia	**Sept. 13 and 14**	**Jeckyll Island**	**Corsair Motel**
Michigan	**Sept. 18, 19 and 20**	**Lansing**	**Jack Tar**
Rocky Mountain	**Sept. 19, 20 and 21**	**Salt Lake City, Utah**	**Hotel Utah**
West Virginia	**Sept. 24 and 25**	**Wheeling**	**Oglebay Park**
North Carolina	**Sept. 30, Oct. 1, 2 and 3**	**Pinehurst**	**Carolina Hotel**
New England	**Oct. 1, 2 and 3**	**Poland, Me.**	**Poland Spring Hotel**
Montana	**Oct. 9 and 10**	**Great Falls**	**Park Hotel**
USITA	**Oct. 22, 23 and 24**	**Chicago**	**Conrad Hilton**
Virginia	**Nov. 8 and 9**	**Roanoke**	**Hotel Roanoke**
Alabama-Mississippi*	**Nov. 12 and 13**	**Birmingham, Ala.**	**Thomas Jefferson Hotel**
Oklahoma	**Nov. 14 and 15**	**Oklahoma City**	**Skirvin**
Florida	**Nov. 25, 26 and 27**	**St. Petersburg**	**Tides Hotel & Bath Club**
South Carolina	**Dec. 3 and 4**	**Columbia**	**Wade Hampton**

***Joint meeting**

Asked Mr. Gross, "Is the Korean War over? . . . why (is) there in this bill each year an extension of the tax on luxuries as well as on essentials? Why do (we) not have a bill or legislative procedure by which we can, if we desire, vote to continue the tax on non-essentials and vote against a continuation of the taxes on essentials?"

Continuing, Mr. Gross said, "I was reading in the newspapers of the position of the Secretary of the Treasury, Mr. Dillon, who now says that next year the Kennedy administration will call for an income tax reduction. Does this bill have the approval of Mr. Dillon?"

Later in his discussion with the proponents of the bill, Mr. Gross wanted to know why Congress each year was confronted with a bill for the extension of taxes on luxuries in the same bill with a continuation of taxes levied upon essentials during wartime. He specifically objected to the telephone tax.

Rep. Paul G. Rogers (D., Fla.) made a ringing objection to the telephone tax which he termed "grossly unfair to a very large group of American taxpayers."

He said, "I have also introduced legislation to repeal the tax on telephone service, believing that this tax is another one which has outlived its purpose. The telephone tax is another wartime measure and was imposed during World War I to curb unnecessary usage of the telephone. The tax was removed shortly after the war. It has since been reinstituted, was broadened during World War II, and has never been repealed for a second time.

"The telephone users of America are great in number," he continued. "The tax burden imposed on them under present law is unjust because they are taxed on an essential utility. Yet there is no federal tax on the use of gas, water, and electricity.

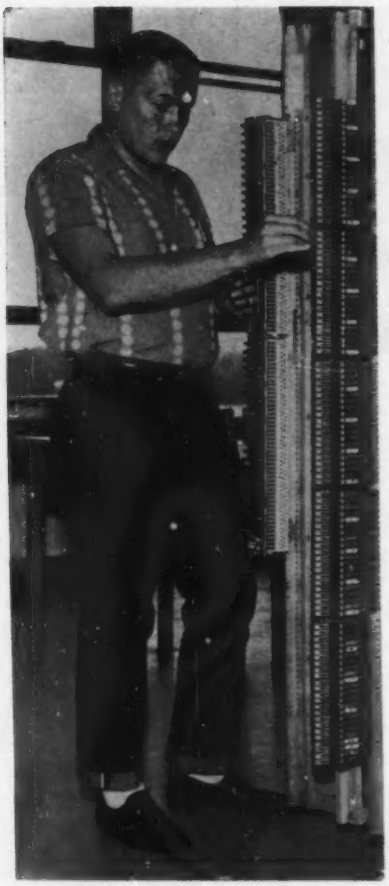
"Mr. Speaker, the telephone companies of this nation are now compelled to collect and remit to the Federal Government the 10 per cent tax currently imposed on the American telephone user. Were the Congress to repeal this tax, each of these Americans would realize a 10 per cent reduction in his telephone bill."

Mr. Rogers concluded by saying he believed that government spending can be greatly reduced and added that one positive way in which expenditures could be decreased is by reducing taxes. "The less we tax," he said, "the less we spend."

Rep. Bruce Alger (R., Tex.) disapproved strenuously of continuing the tax, stating that the time has come to start reducing taxes rather than continuing wartime measures.

Said Mr. Alger, "The President and many economists, even the men im-

(Continued on page 44)



Charles Grauer, first recipient of the TELEPHONY scholarship, is shown in the laboratory at Southern Tech where he learned how to work with telephone equipment.

C.E. Grauer Completes Course at Southern Tech; New Recipient to Be Named

JUNE IS A MONTH of significance to many—it's the special time of year for brides, vacations, summer activities, and graduation.

June, 1962, has extra special significance for TELEPHONY and Charles E. Grauer, son of Mr. and Mrs. Paul F. Grauer of Wilson, Kan.

Charles, who is finishing his two-year studies in electrical engineering technology (Telephone Option) at Southern Technical Institute in Marietta, Ga., was the recipient of the first annual $500 scholarship established by TELEPHONY, in 1960. This month he also is joining the Independent telephone industry.

As another special point, Charles also is a part of the first graduating class to finish its studies at the new campus of Southern Tech at Marietta. When he entered school in September, 1960, the school occupied 20 acres at the site of a Naval air station in Chamblee, Ga. In the fall of 1961, the school was moved to the present 120-acre campus in Marietta.

In 1960, Charles was selected to receive the TELEPHONY scholarship by a Southern Tech faculty committee from a group of applicants on the basis of his high school scholastic record and his general character. (TELEPHONY, Apr. 16, and Nov. 5, 1960). According to Southern Tech, he has maintained a good scholastic record and made the Dean's list in the winter quarter of 1962.

This month Charles will become plant superintendent for the Wilson (Kan.) Telephone Co., joining his father, Paul Grauer, who is manager, and his brother, Robert, also a Southern Tech graduate.

While in school, Charles served as sergeant-at-arms of Epsilon Pi Chi social fraternity, as secretary of Tau Epsilon Sigma semi-professional fraternity, and as treasurer of Toastmasters International.

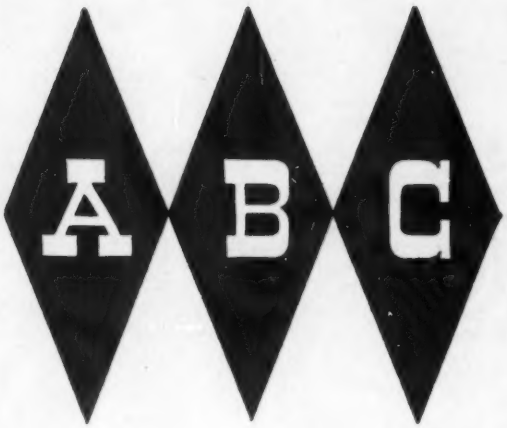
During his summer vacations, he has returned to Wilson each year to work for the telephone company.

The recipient of the second TELEPHONY scholarship will be chosen for the fall, 1962, quarter at Southern Tech. The deadline for applications is Aug. 1. The scholarship provides $500 annually toward fees and books for a student of the Telephone Technology course at Southern Tech.

The recipient is selected by a committee consisting of the director of the institute, three deans of the school, and the head of the department of electrical technology. Selection is made on the basis of the applicant's record in high school, especially in the areas of mathematics, science, and English; his general intelligence; his interest in entering the telephone industry for a career; his general character and

(Continued on page 48)

Charles E. Grauer checks some telephone equipment under the watchful guidance of an instructor at Southern Tech.



of the Telephone

by Frank E. Lee

PART 103. THE TELEPHONE FLEET Section 6—Economy Maintenance Program—Spark is Important for Engine Performance.

FUEL, COMPRESSION, and spark—these are the three basic components of internal combustion engine operation. All three must be present before the engine will run. However, an engine that merely runs is not enough. The engine must deliver peak horsepower—economically—day in and day out through the four seasons of the year.

This is a large order, and making sure the order is filled is one of the key responsibilities of the people who maintain the operating efficiency of the telephone fleet. Carrying out this responsibility should involve two basic considerations.

First, the vehicles should be in condition to carry out the fleet's operating responsibilities each day. Second, this job should be done as efficiently as possible and still meet the primary service objective. As pointed out in a previous article in this series—a fleet vehicle generally is operating most reliably when operating most efficiently. Thus, both reliability and economy can be enhanced by a realistic economy maintenance program.

Actually, the economy maintenance program being discussed in these articles is concerned with about 45 per cent of the total annual cost of operating the average telephone fleet vehicle. Annual operating costs for this average fleet vehicle will range from $1,300 to $1,500, depending on a number of factors, such as:

- The population density of the area in which the vehicle operates.
- The terrain over which the vehicle is driven.
- The average daily temperature of the area.
- The speed at which the vehicle is driven.
- The effectiveness of the maintenance given this specific fleet vehicle.

The annual operating cost can be divided approximately as follows:

Repairs and service	25%
Fuel and oil	20%
Depreciation	20%
Garage and storage	18%
Miscellaneous expense	17%

The 45 per cent of annual operating cost mentioned previously includes the first two items, namely, repairs and service, and fuel and oil.

An inexperienced fleet manager may fall into the trap of measuring maintenance efficiency by either shop operating costs or miles per gallon alone. In reality, efficiency is a combination of these two elements. An effective economy maintenance program will cut both of these costs. Fuel and oil costs can be reduced by keeping the fleet in good operating condition. Repair charges can be reduced by uncovering trouble conditions and making minor repairs as needed. This will increase the number of efficient operating miles between major overhaul or replacement periods.

From the standpoint of the economy maintenance program the entire ignition system centers around providing each cylinder with a spark of the correct intensity—at the precise instant that the spark should be delivered. The key to efficient ignition is spelled out by the idea of delivering a spark of the correct intensity at a precise instant.

The elements of an automotive ignition system are the battery, ignition coil, distributor, and spark plugs. Closely associated with these components are the generator or alternator, voltage regulator, ammeter or generator charge lamp, ignition switch and the starter. The operations of each of these elements individually and in combination are closely related to the efficiency of the ignition system.

The question could be raised as to why include the starter and voltage regulator in a discussion of the ignition system. The starter places the heaviest drain on the battery. Thus, a defective starter may place sufficient drain on the battery to starve the ignition system to a point where a spark will not be produced to fire the compressed fuel, air mixture in the cylinders. The voltage regulator controls the battery charge rate and voltage. Both are essential to effective, efficient ignition.

Reliable Test Equipment Needed

Reliable test equipment is playing an increasingly important role in testing and adjusting automotive ignition system components. Testing equipment should be used to spot conditions that cause an engine gradually to fall away from peak performance. Test equipment should also be used to recheck the system after repairs are completed.

Interestingly enough, a majority of the ignition system tests are made with voltmeters and ammeters. Knowing how much current is flowing and how many volts of electromotive force are available is of vital importance to the automotive technician. Accuracy of these measurements is of vital importance.

Ohmmeters, distributor testers, pre-

cision built coil and condenser testers and similar test equipment are needed to service today's automotive engines properly. A primary advantage in using specialized testing equipment is that direct readings of electrical conditions can be made to speed up analysis procedures. The need to compute variable conditions is eliminated and the chance of making errors in calculations is eliminated.

A problem in automotive shop operation is maintaining the accuracy of test equipment used for service operations. Test equipment used in an automotive shop usually is subjected to severe abuse that would damage test equipment built to precision laboratory standards. The practice usually is to build test equipment that is a compromise between ruggedness and accuracy. One way to combat this sacrifice in accuracy is to use a precision standard voltmeter and ammeter similar to the test unit shown in *Fig. 1* to check periodically the accuracy of the test equipment used in the shop. The tester shown in Fig. 1 is accurate to within one half of one per cent. This tester seldom, if ever,

Fig. 1

leaves the shop tool room, and is not subjected to severe handling in service operations. Thus, this tester will serve for years as a shop standard of accuracy.

The Storage Battery

Good ignition, a basic requirement of top engine performance, depends upon a good battery. All tests and measurements of other components in the ignition system are of little consequence unless the battery is in good condition and properly charged. The electrolyte in each of the battery cells can usually be checked while the engine is warming up in preparation for further tests of the ignition system. The specific gravity reading of each battery cell should be between 1.225 and 1.275 on the hydrometer scale. Readings below 1.225 indicate a low battery or a battery nearly discharged. A specific gravity reading of over 1.280 is a sign the battery is being overcharged. Prolonged overcharging will shorten its life.

The temperature of the battery should be checked after the engine has warmed up. As a rule, the battery temperature is taken by inserting a thermometer in a center cell. The temperature should not go over 110° F. A higher reading usually should be taken as a sign that the charging rate is too high. This will cause rapid battery deterioration.

Each battery cell should be filled with enough electrolyte solution to cover the plates to a depth of ¼ to ½ inch. Look for possible leaks in the container or cover if one cell regularly requires more water than the other cells to restore the electrolyte to the proper level. Check also that the vent holes in the cap are unrestricted.

The hydrometer readings show only the chemical condition of the battery. The actual power of the battery should be checked with the battery discharging a fairly heavy current. The battery can be checked with a volt-amp tester, equipped with a carbon pile current loading device. The battery can be discharged with this unit at a rate of about three times the ampere-hour rating for 15 seconds. A 12-volt battery should indicate not less than 9.6 volts at the end of this test. A good battery will quickly return to normal voltage shortly after the engine is started at the conclusion of the test. Batteries that show a drastic loss of voltage under the load test should be placed on charge and rechecked. Replace the battery if a second load test—after the charge period—shows no improvement.

Battery cables and terminals should be checked for frayed insulation and corrosion. Poor insulation and corrosion, by setting up excess resistance or losing current to ground, can cause a loss of battery power. Also, make sure that all battery terminals are tight.

A corroded or cracked battery holddown can ruin a good battery. If replacement is warranted, a plastic-coated steel holddown is recommended.

The engine ground strap, while not directly connected to the battery should be checked as a part of the battery service procedure. Replace frayed or broken straps. Be sure the connections to the engine and frame are clean and tight. The ground strap provides the return connection between the engine—suspended in rubber mounts—and the battery.

Overall Ignition Test

The overall ignition test can be used to determine if it is in good condition or if further test and inspection is required. This test, like other overall operating tests, saves considerable maintenance time and improves the efficiency of the economy maintenance program.

An artificial overload—in the form of a variable spark gap—is introduced into the secondary, or high tension side, of the ignition system in making an overall ignition test. The spark gap is variable from 0 to 15 millimeters as required for these tests. The variable spark gap ignition test is made as follows:

- Remove the distributor lead from the center top of the ignition coil.
- Connect one high tension lead of the variable spark gap to the tip of the disconnected lead.
- Connect the second high tension lead of the variable spark gap to an adapter placed in the center top of the ignition coil.
  Note: This restores the ignition coil and distributor connection with the variable spark gap tester in series.
- Set the spark gap at five millimeters and connect in series with the ignition lead.

The engine should start easily and operate at idle, medium, or high speed with normal acceleration without misfiring. A neon tube generally is used to indicate if the engine is firing. The tube will remain lighted if the ignition system is firing steadily. Further tests and inspections are required if the tube fires intermittently, indicating the ignition system is misfiring.

The variable spark gap test can be made more critical by increasing the spacing of the spark gap.

Ignition Coil Test

The ignition coil develops the high voltage impulses that enable the spark plugs to ignite the compressed charge in the individual cylinders.

Before attempting to test the coil, make sure the primary connections are clean and tight. Also, remove any accumulated dirt and carbon from the coil tower. A dirty coil tower may cause flashovers during regular engine operation or when coil tests are in progress.

A coil properly polarized and in good condition will consistently pass a spark across the spark gap without misfiring. If the coil misfires, one or both of the windings are defective and replacement is recommended.

Tests of the ignition coil can be made with some test equipment while the coil remains mounted in the engine. In these tests the analyzers energize the primary circuit of the coil

and the breaker motor of the analyzer opens and closes the circuit, as does the distributor in regular operation. The secondary winding of the ignition coil is connected in series with a variable spark gap. The spacing of the spark gap can be set in accordance with the engine manufacturer's specifications to provide an exacting test of the coil.

The voltage at the spark plugs may be reduced and misfiring may occur

Fig. 2.

if the polarity of the coil is reversed. Missing caused by this condition generally will occur during accelerating and full throttle operation. As a result, a coil with a reversed polarity usually will not be detected with a more or less routine test at an idling speed.

The reversed polarity can be caused by reversing the primary leads of the coil or by a battery incorrectly installed. A reversed coil does not appear to be too serious at first glance. However, the polarity at the spark plugs will also be reversed. The plug polarity will be positive instead of negative. This means the spark will be forced to jump from the grounded engine block to the center electrode of the plug being fired. An increase in ignition system voltage on the order of 40 per cent is required to produce as hot a spark under these conditions, as compared to operating with a coil connected for proper polarity.

A high reading voltmeter or a precision coil tester, *Fig. 2*, can be used to identify a polarity reversal in the ignition coil. The ignition pattern displayed on an engine analyzer oscilliscope will be reversed on the screen if the coil polarity is reversed.

Distributor Inspection

The distributor should be given a careful visual inspection, in addition to making certain electrical tests during the economy maintenance procedure. The visual inspection should include the following:

(1) Check the breaker points for build-up or pitting. Some distributor point wear is normal. In fact, the central surfaces of breaker points that have been used will not be smooth and bright. However, if the points are free of pits and projections they probably are making better contact than when they were new.

A build-up or crater in a point usually is a sign of an unbalance in the ignition system. The unbalance is generally caused by the condenser, and a slight change in the condenser capacity will correct the condition. A crater on the positive contact indicates the condenser has too much capacity. A crater in the negative contact indicates the condenser has too little capacity.

(2) The distributor should be clean and dry. Remove any moisture and excess grease and oil.

(3) Clean dirty cap terminal segments by scraping with a knife before making any tests. The usual gap between the rotor and the cap segments is on the order of .010" to .020". Thus the rotor does not make contact with the segments, *Fig. 3*.

The gap between the rotor and the cap terminals, being

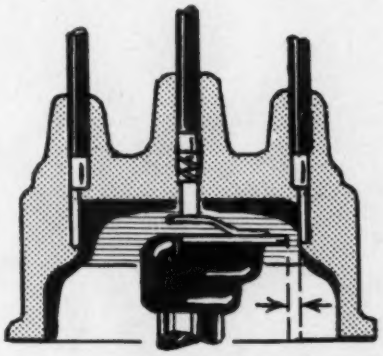


Fig. 3

under atmospheric pressure, has practically no resistance to the high voltage spark, as compared to the spark plug gap operating under the compression of the engine cylinder. However, dirt on the cap terminals would add materially to the distributor gap resistance. This would tend to reduce the effective voltage delivered to the spark plug.

(4) Polish the contact button of the rotor with No. 2/0 sand paper. Carefully scrape the edge of the rotor with a knife to remove any corrosion. Avoid using a file because removal of metal from the edge will increase the gap between the rotor and the cap terminals.

(5) Test the internal insulation and capacity of the condenser. The internal insulation test is made

Fig. 4

with a megohmmeter and the capacity is measured with a microhmmeter. These two meters usually are combined as a single unit on the more recent condenser testers. The selection of a particular scale is controlled by a switch conveniently located on the test unit.

(6) Check the lubrication of the distributors. In most instances distributors suffer from over-lubrication. However, this is no reason to neglect distributor lubrication altogether. Lubrication usually is required at three places as follows:

Cam—Apply a light film of high temperature type grease to the cam. Apply sparingly because excess lubricant may be thrown over the points and cause ignition failure.

Centrifugal advance mechanism—This mechanism usually is located under the distributor breaker plate. Lubrication is accomplished through a small felt wick extending upward through the distributor shaft. Remove the rotor and apply two or three drops of SAE 20 motor oil to the wick at the top of the shaft.

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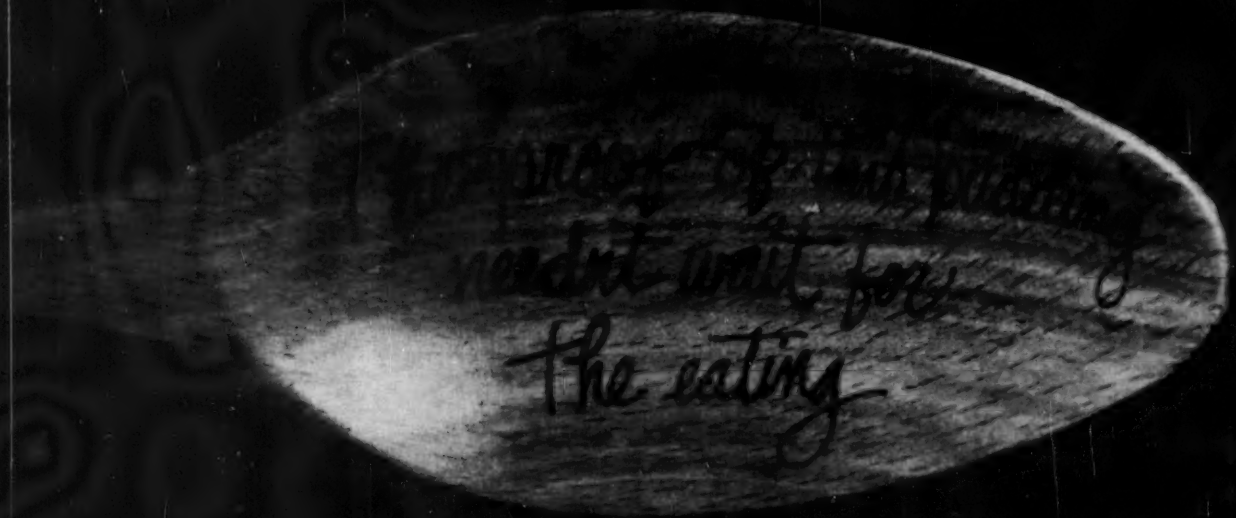

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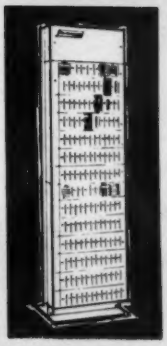

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New Developments in Telephony

By RAY BLAIN

THIS IS THE second article in a series describing various new items of equipment and their application in telephony. The first article appeared in the June 9 issue.

Readers desiring additional information on any of the products described should write the manufacturers or TELEPHONY.

* * *

LN Carrier System (Fig. 7.). The Panhandle Electric Type "LN" carrier is a fully transistorized 12-channel cable carrier system designed for

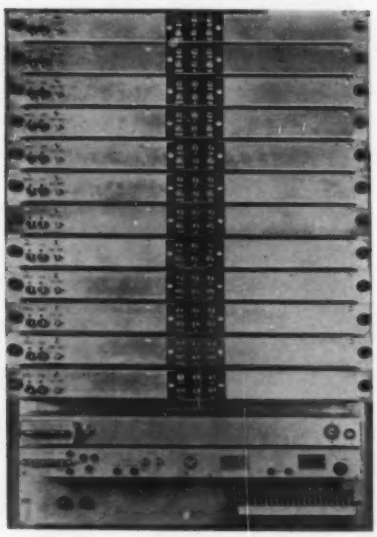


Fig. 7. "LN" carrier terminal fully equipped.

short-haul use over toll or exchange grade cables. It employs double sideband transmitted carrier transmission using the same channel frequencies and carrier levels as Western Electric's Type "N" carrier systems. It operates on a four-wire basis with different frequency bands applied to the line for the two directions of transmission.

The "LN" carrier systems are compatible with Western Electric's "N1" carrier, and "N1" or Lenkurt's "BN" repeaters may be used with "LN" terminals if the limitations observed in applying them to "N1" installations are also observed for "LN" installations.

In order to obtain directional separation, different frequency bands and separate cable pairs are used for each direction of transmission. The high group transmitting frequencies are in the 164 to 260 kc band with the channel No. 1 carrier at 168 kc and the channel No. 12 carrier at 256 kc; the low group transmitting frequencies are in the 44 to 140 kc band with the channel No. 1 carrier at 136 kc and the channel No. 12 at 48 kc.

Individual channel frequencies are spaced 8 kc apart and carrier power is provided by individual crystal controlled carrier oscillators which are a part of each channel unit. The generated frequencies are all in the 168 to 256 kc range with the low group transmitting frequencies being derived by group modulating a 304 kc carrier with the basic channel frequencies and selecting the lower sideband. The frequency space below 36 kc is not used except for feeding dc power to repeaters associated with the carrier system.

The type "LN" carrier uses a 3,700-cycle tone for out-of-band signaling. This tone is generated in the common equipment unit and is transmitted over each channel during the idle circuit or "on-hook" condition. It is interrupted by an "off-hook" condition which corresponds to battery being placed on the "M" lead by the associated trunk circuit. Absence of the 3,700-cycle tone at the receiving terminal causes the channel receive relay to place ground on the "E" lead, thereby seizing the associated trunk circuit at that end.

Companders are provided as an integral part of each channel unit. Their use eliminates the need of crosstalk balancing and special noise treatment of the cable pairs, and leads to more lenient selectivity requirements for the receiving channel filters. Nearly all of the noise and crosstalk interference encountered in carrier systems operation are reduced through the use of the compander.

•

Microwave Heterodyne Repeater (Fig. 8). Collins Radio Co. of Dallas, Tex., has announced a line of microwave heterodyne repeaters for long-haul, high-density systems in the 6-gigacycle band. Two heterodyne systems are available. The IF heterodyne system which provides signal amplification at an intermediate frequency of 70 megacycles and the RF heterodyne system which amplifies the repeated signal at microwave frequencies.

Principle advantages of the heterodyne repeating systems over the demodulating/remodulating repeaters, according to Collins, are elimination of the nonlinear distortion which accompanies the demodulation and modulation processes and elimination of the linear frequency-amplitude and frequency-phase distortion which occur when the baseband signal is processed through a repeater station in direct video form. Signal level stability is maintained constant, independent of propagation fluctuations by an auto-

Now available . . .

DELCO-PHONE

with

DIAL!

Available with "HANDS-FREE" DELCO-PHONE

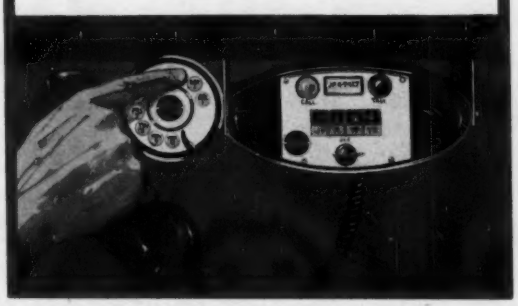
Reduces Your MTS Operating Costs—Increases Efficiency. Now you can offer your subscribers the DELCO-PHONE mobile telephone with fully automatic vehicular dialing. This new accessory is available to all telephone companies who have or are planning mobile dial service.

The DELCO-PHONE dial looks like and functions like the dial on the newest home telephone. The user merely selects a clear channel and dials his number—direct!

The advantages of DELCO-PHONE with dial to your company are obvious. You increase MTS efficiency while reducing the number of mobile service operators. What's more, you enjoy the benefits of regular toll ticketing and message unit procedures.

For information, write "DELCO-PHONE," Delco Radio Div., Kokomo, Ind., or phone GLadstone 2-8211 (area code 317).

Also available with
Standard Handset DELCO-PHONE



DELCO-PHONE

Delco Radio • Division of General Motors • Kokomo, Indiana

matic gain control loop using an electronically variable ferrite attenuator.

The IF (Intermediate Frequency) heterodyne system converts the received RF signal to 70-megacycle IF frequency using a Collins standard broadband receiver. After amplification and limiting, the 70-megacycle signal is applied to a balanced varacter diode modulator using a 6-gigacycle pump. The output signal from the converter at the RF frequency is then amplified by a 5-watt traveling wave tube power amplifier. The automatic frequency control unit regulates the frequency of the pump oscillator making the output frequency independent of the 70-megacycle frequency stability. Drops are provided by a discriminator output and insertions on the baseband are made by modulating the pump oscillator. In this manner, service channels and supervisory circuits can be provided at repeater stations. Performance characteristics of the IF heterodyne systems are as follows: Receiver noise figure 14 db maximum; power output, 5 watts; frequency stability ± .01 per cent or better, frequency modulation deviation ± 4 mc; baseband frequency response ± 0.25 db from 60 kc to 3 mc; ± 0.5 db, 60 cps to 7 mc.

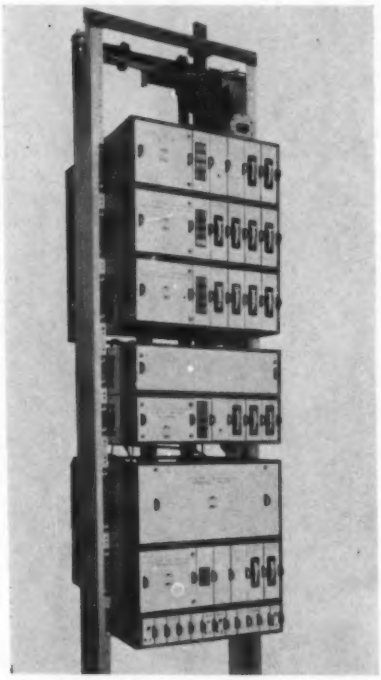


Fig. 8 Microwave heterodyne repeater.

The RF heterodyne system offers much greater capacity than the IF system. In this system, the signal remains at microwave frequencies from the transmit terminal, through the repeaters, to the microwave discriminator at the receive terminal. The receiver section of the through repeaters and the terminal receiver use parametric amplifier input stages which have a maximum noise figure of 6 db and thus provide a system noise figure of less than 7 db. This provides an improvement over the standard crystal mixer input of at least 7 db.

The receiver input stage is followed by two additional stages of parametric amplification which give additional gain and shift the operating frequency to prevent feedback between the input and output of the repeater. Two stages of traveling wave tube amplifiers then amplify the signal to the 5-watt output level. At the receive terminal the traveling wave output tube drives a microwave discriminator to recover the baseband signal.

Service channel and supervisory circuits are dropped by use of a discriminator and reinserted by modulating a pump oscillator. Performance characteristics of the Collins RF heterodyne system are: Transmitter output power 5 watts, receiver noise figure 7.0 db maximum; type of modulation FM, baseband frequency response ± 0.25 db from 1 kc to 10 mc, ± 0.5 db, —3.0 db from 1 kc to 12 mc. Frequency response from 5 cps to 1 kc is determined by adjustment for best 60 cps square wave transmission.

•

Universal Communications Transmitter (Fig. 9). The Erco Radio Laboratories, Inc.'s 637-T transmitter is a fixed frequency, crystal controlled unit designed to fill the need for a universal application. It can be used for any air-ground service in the 225-400 mc communications band.

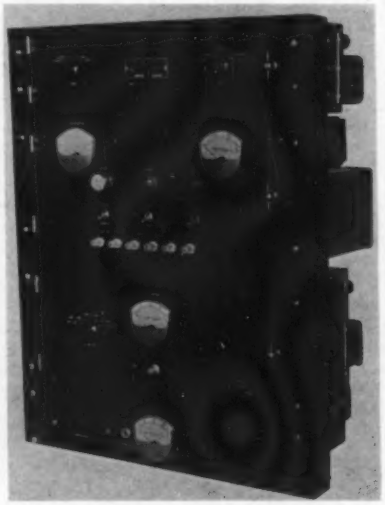


Fig. 9. Universal communications transmitter.

The company announces the following design features:

Modular construction features permit plug-in multiplier strip and IPA strip to form a complete 10 watt RF unit in an 8-¾ x 19-inch rack panel construction for low power applications and requires only the addition of a modulator panel. The modulator unit is completely solid state and requires only 3½ inches of panel space. This unit features individual drawer-type modules with a low distortion compressor and low power drain.

The power amplifier unit, when added to the above combination, together with its power supply, completes the 50 watt AM package. This unit can then operate in Class AB, mode as above for AM, or can be switched to Class C condition for use as an amplifier for FM applications. It may also be used with a high level modulator for Class C AM operation at increased power.

•

Data Communications System. (Fig. 10). General Electric Co. has designed a new transistorized data communications terminal capable of transmitting up to 90,000 characters per second, but primarily engineered for standard tape speeds of 15,000 to 22,500.

Fig. 10. Data communications system.

Designated as the TDS-90, it enables large, fast-operating computers in ma-

(Continued on page 54)

Delegates to Wisconsin Convention Urged to:

Take Time to Think

By Dan S. Fargo

EVERY MANAGEMENT person should have an hour a day in which to think—no visitors, no telephone calls, just solitude. This was one of many viewpoints advanced by Professor William P. Stilwell, assistant director, Management Institute, University of Wisconsin, at the Wisconsin State Telephone Association convention, held in Milwaukee on May 8 and 9. Professor Stilwell spoke on a program notable as usual for its appeal on a wide range of subjects. President D. H. Hansen, of La Crosse, presided.

Professor Stilwell, who included the hour of contemplation idea in his talk on "You and Your Efficiency", advised adjusting to optimum size many of one's activities. "For example," he said, "with a little planning, there's hardly anything that can't be shortened—a telephone call—or a letter (underline important parts the first time through so you don't have to read all the letter again.)"

Essay on Time

Contained in mimeographed material Stilwell passed out was an essay by Arnold Bennett on time, which said in part: " . . . you cannot get into debt for time. You can only waste the passing moment. You cannot waste tomorrow. . . .

"The next year, the next day, the next hour are lying ready for you—as perfect, as unspoiled, as if you had never misapplied a single moment in all of your career. You can turn over a new leaf every hour, if you choose."

For those interested in a thoroughgoing analysis of their use of time, Stilwell offered a three-step method to save time, which is, in brief:

(1) Gather facts. Keep a time analysis sheet with the day divided in 15-minute blocks. Note down helpful comments.

(2) Analyze. Label activities as "must", "can", "should", "needn't". Study them also from the standpoint of what one likes and dislikes doing.

(3) Act. Eliminate the unnecessary. Combine activities—do several things at once. Delegate. Here, Professor Stilwell said, it is well to keep in mind that people to whom things are being delegated often resist anything which is new, different, unexpected, or over which they have no control. By anticipating this, the path of delegation may be smoothed.

Alternate Standards

At the REA Borrowers' Conference, William J. Nichols of Washington, D. C., chief, engineering branch, north central area—REA, spoke of new alternate standards being proposed for REA borrowers. Under the proposal, five-party service would be provided in rural areas, with one and two-party service within the base rate area of the exchange. He opined that the five-party rural rate should be equal to, or slightly above the residence two-party rate.

Nichols also cited the trend to underground construction pointing out that 30,000 miles of buried plant would be placed by REA borrowers in 1962, compared to 17,000 miles of aerial in 1965, it is estimated that 45,000 miles of underground plant will be placed by borrowers as compared to 17,000 miles of aerial. Policies regarding the use of private right-of-way have also been revised. Originally it was the belief private right-of-way was too costly but now it is proving more economical.

Another diversion from an earlier policy of REA relates to terminal-per-line versus terminal-per-station central office equipment. Nichols said that all new offices in the future would be equipped with terminal-per-station equipment.

Keeping Abreast

He went on to say "REA is recognizing its responsibilities in keeping abreast of the developments of the electronic age in telephony. REA is also cognizant of its responsibilities in assisting its borrowers in the maintenance of systems that have been in operation on a dial basis for the past eight or 10 years.

Sergio Rojas, formerly Cuba Ambassador to Great Britain, emphasizes a point in his address to Badgers on "Cuba—The Great Communist Conspiracy". Senor Rojas urged his convention listeners to be alert to the Soviet menace in Latin America.

"In this latter cause, REA is working with the management of the various telephone systems in conducting maintenance workshops for the plant personnel for outside plant facilities, central office equipment, carrier equipment and station equipment, as well as the use of the various test equipment needed to maintain properly these systems in order to keep maintenance costs at a minimum."

D. H. Hansen reminded the delegates the only justification a telephone company has for existence is providing service to its customers, and the obligation of an industry association is to aid its member companies in the rendering of that service. He commented on three specific projects of the association designed to improve the operating efficiency of companies throughout the state: (1) the merchandising seminars provided new ideas in methods of filling customer requirements; (2) the management seminar has offered a condensed training program for management personnel, and (3) a group life insurance

program has been made available to employes of smaller companies, who by their size, are unable to obtain coverage by conventional individual company group plans.

Management Seminars

In referring to the association management seminars conducted at the University of Wisconsin in conjunction with the Management Institute, Hansen said:

"These seminars are no substitute for Harvard or for the seminars put on by USITA. They are, however, designed to meet the needs of most companies in our state. Length of seminars has been confined to two or three days so that representatives of even the smallest companies can find the time to attend."

He explained that much of the management in the industry today has come up through the ranks and that seminars such as those developed by the Wisconsin State Telephone Association are a tool that companies can employ in assisting these managerial people to do the job that is expected of them.

In reporting to members, Ray J. Riordan, executive vice president of the Wisconsin State Telephone Association, revealed that at the end of December, 1961, 151 telephone companies were serving the communication needs of telephone subscribers through 612 exchanges in the state. Of the 1,601,165 stations in service, 1,479,476 were dial operated (92.4 percent), while 121,689 remain to be converted. He said that by the end of 1962 the number of companies would be reduced to 145, the number of telephones close to 1,650,000 with 94.5 percent dial operated and that by the end of 1965 there would be 1,850,000 dial telephones owned by 125 companies serving Wisconsin's estimated 4,250,000 population. In that year it is expected the industry will convert its last manual station in Wisconsin.

Discusses Taxes

With respect to the revised tax program passed by the Wisconsin legislature in December, Riordan described the selective sales tax levied on business monthly service charges as "discriminatory and inequitable". He explained that the legislature would have extended the tax to intrastate toll calls originating from business telephones but for efforts extended by industry representatives to combat the legislation.

"It is regretable", he said, "but the telephone industry is rapidly joining the gasoline, liquor and tobacco industries as one of the more effective collection agencies for state and federal tax departments. The legislators look upon us as an "easy touch" since, unfortunately, we do a most ineffective job of rousing our customers' ire against the mountain of taxes added to their monthly communications bill".

One good did come out of the tax measure, Riordan pointed out. The gross revenue tax to which telephone companies are subject in Wisconsin, was reduced by 10 per cent as a result of an amendment to the tax bill sponsored by the industry.

Harold R. Bollinger of Waconia,

Directors and officers of the Wisconsin State Telephone Association posed for this year's convention portrait recently. Seated (left to right), first row are: Tony M. Gotstein of Casco; Harris G. Allen of Milton Junction; Phil Bigley of Viroqua, and incoming association president; D. H. Hansen of LaCrosse, outgoing president; H. L. Olson of Weyauwega; and J. H. Hesselman of Mondovi. Second row (left to right):Ray J. Riordan, executive vice president of Wisconsin association; R. G. Peterson of Wittenberg; J. F. O'Connell of Madison; George F. Griffin of Amery, association vice president; Allan C. Brown of Rhinelander; H. M. Smith of Neillsville; and E. L. Beyl of Osceola. Absent when photo was taken were: Gilbert A. Karcher of Wheatland; G. A. Rutenbeck of Milwaukee and Howard Tesdale of Sparta.

Minn., first vice president of the United States Independent Telephone Association, extended "Greetings from USITA". He strongly appealed for increased membership among Independents not now members of the national association. He pointed out there would be very little progress in Independent telephony without the state and national associations. He said 18 USITA employes are working with committees on national associa-

Official representative of United States Independent Telephone Association at the Wisconsin telephone convention was USITA first vice president, Harold R. Bollinger of Waconia, Minn. Mr. Bollinger complimented the association upon its merchandising and management seminars sponsored at the University of Wisconsin.

tion activities which are too complex for state associations to take on, the Toll Settlements Committee being a good example.

Mr. Bollinger observed that all types and sizes of companies are represented on the USITA board.

Wise Spending

Mr. Bollinger said he feels it is important for telephone people to speak out in favor of wise spending of tax dollars—a tax dollar saved is as important as a tax dollar paid. He also pointed out it is essential to operate telephone companies as economically as possible—from top to bottom. "If we can do this, we'll merit public support and with this I have no fear for the future," he stated.

Discussion of a proposed association group life insurance program was conducted by C. R. Hyink of the Seefurth-McGiveran Corp.

Mr. Hyink summarized the advantages to employers of the group life insurance program as follows:

(1) Valuable men are highly sought after by other companies. A liberal group insurance program helps you hire and keep valuable personnel.
(2) Relieves you, as a close friend and associate, of difficult financial problems arising out of the death of personnel.
(3) Because your personnel benefit from it, the plan can be a profitable investment in the future stability and security of your firm.
(4) It provides all participating companies with all the advantages of Group Insurance for their personnel.
(5) It provides the firm that now has group life insurance with a fine supplement.
(6) It offers greater peace of mind to personnel and thus makes for more efficient and more effective employes.
(7) Favorable tax treatment.

Penetrating Look

"Wisconsin's Economic Growth and Taxes" were given a penetrating look by Arch Ely, executive director of the Public Expenditure Survey of Wisconsin. He stated there are those who feel the present 29 per cent of

Smiling Mrs. Don Hansen, of LaCrosse, wife of Wisconsin association's retiring president, busily officiated at registration desk, accepting reservations for women's party held during the annual convention.

our national product which is devoted to the operation of government, is inadequate and that 35 to 40 per cent would be more appropriate. Partly because of this, and because of other excellent reasons, associations and other interested groups and individuals must work together on this matter of government and taxes, he said.

Mr. Ely noted that in the wake of Wisconsin's 1961 tax revision, there

Snapped during the men's stag dinner preceding recent 52nd Wisconsin telephone convention were Wisconsin Supreme Court Justice William H. Dietrich, left, and H. A. Halbeck, president of General Telephone Co. of Wisconsin, Madison.

has come a backlash of interest in seeing that state governments operate more efficiently and that expenditures be reduced where possible. He urged that more searching questions be asked about expenditures for state education; for instance, in regard to more careful utilization of existing facilities and location of new.

As for certain welfare expenditures, Mr. Ely feels that since some professionals in government have concentrated on aiding the unfortunate, this has led to a lessening of a responsible attitude by recipients of aid, and in some cases, such as aid to dependent children, to moral laxity.

Rid of Fears

"Americans must wake up and protect what we have—get rid of fears of the future. There's absolutely no limit to where we can go from the amazing pinnacle we've now reached." This was part of the impact of the message, "Opportunities Unlimited", delivered by Calvin Dean Johnson, of the American Trucking Association, Inc.

Mr. Johnson described tearing out some of the fireplaces in the old Bowie mansion near Washington, D. C., which he and his family bought when he was a representative in Congress. He said as he made these changes in the house he wondered what the Bowies thought about as they sat before the fireplace; perhaps: public office is a public trust; a day's work for a day's pay; or possibly: there's no limit to the heights a man can scale.

Mr. Johnson also advanced a plan

(Continued on page 51)

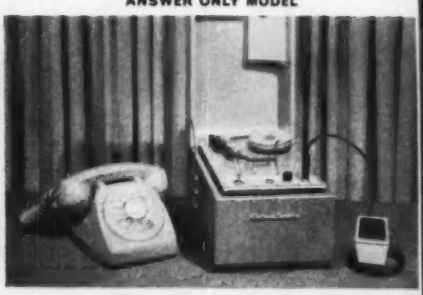
For Air Travel...Reservation

ILLINOIS BELL TELEPHONE COMPANY INSTALLATION, AMERICAN AIRLINES' CHICAGO RESERVATION OFFICE

LONG PLAY MODEL

SHORT PLAY MODEL

ANSWER ONLY MODEL



Handling is Important

"American Airlines reduces operating costs... speeds service... improves efficiency with

ELECTRONIC SECRETARY®

telephone answering sets"

H. Kenneth Olds, *Reservations Manager*, American Airlines, Chicago Office

According to Mr. Olds, the Reservations Department experiences definite peaks and valleys. Actual reservations are made at the O'Hare Field and loop offices, but this is only a small part of the procedure. The name and address of each passenger, together with flight information, must be confirmed and processed through American's Sales Department. Up until a few years ago, many girls had to be taken away from other important jobs to help handle peak telephone traffic.

Since the installation of four ELECTRONIC SECRETARY telephone answering sets by the Illinois Bell Telephone Company, one girl is used to transcribe the information on a coded card and relay it to all concerned. Night reservations are processed the following morning, eliminating the need for night operators.

In Reservation handling . . . Electronic Secretary sets are important . . . to American Airlines.

The American Airlines installation is an example of full value from Electronic Secretary telephone answering sets. There are many others.

A large packing company in New York uses 30 sets to take orders from salesmen and customers (local and long distance) during business hours. Each salesman calls at the time allotted to him, eliminating telephone-line-tie-up, and assuring a steady flow of orders. Errors are reduced to a minimum.

A druggist in Wisconsin has his SP Model connected to a special line reserved for physicians' prescriptions. It is a convenience for the doctors and a time-saver for the pharmacist.

A radio station in Pennsylvania uses the AO Model for Dial-the-Weather service. Listeners, who are informed of the feature over the air, appreciate these current, day or night, weather reports.

An automobile dealer in Michigan features a "Sports-Scoreboard" via his AO Model. He calls it a unique community service which has given him a great deal of prestige.

Reservations or prescriptions . . . weather or sports . . . or the usual 24-hour a day, 7-day a week phone answering function, Electronic Secretary telephone answering sets might solve problems for many of YOUR subscribers. And . . . they will build up new revenue for YOU.

Contact Automatic Electric Sales Corporation, Northlake, Illinois, for more information.

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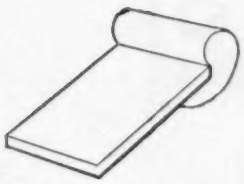
The Plant Man's NOTEBOOK



By RAY BLAIN, Technical Editorial Director

PUBLISHING INFORMATION about the first, the largest, or smallest of anything is usually risky. This proved true when we stated in the Mar. 27 issue that Michigan State University was the first school in the nation to get Centrex, the new PBX system.

First to write us was Don Reist, of Scottsdale, Pa., who advised us that Pennsylvania State University had Centrex prior to the time the Michigan State University was cut into service last August. We have learned that this service was made available to the Pennsylvania University during August, 1959.

Later, C. R. Seline, vice president of Boyce Morgan Associates, Inc., of Washington, D. C., publisher of "Better Business by Telephone", a twice-monthly service to improve telephone methods, gave us a blast.

According to Mr. Seline, the first systems permitting call transfers were installed at the main offices of E. I. du Pont de Nemours & Co., in Wilmington, Del., in July of 1958. Since then, DID (direct in-dialing) has gone into operation at Metropolitan Life in New York, at Dow Chemical, Midland, Mich., at Kaiser's Industries, in Oakland, Cal., and at the Bank of America in San Francisco.

In addition, a number of the larger government departments in Washington have it, as do two other colleges—Ohio State University, and the Air Force Academy. The Department of Water & Power in Los Angeles, and the Chase Manhattan Bank in New York will install Centrex in new buildings now planned or under construction. Sears Roebuck also is studying possibilities for Centrex in its main plant in Chicago.

DID, at present, is practical for big installations only—those having several hundred telephones. Telephone companies are now working on ways and means of offering the service to smaller companies—those with 90 or 100 telephones. One of the big problems with these small systems, however, is cost.

DID makes it possible for a big company to eliminate much expensive switchboard equipment, and effect important savings in operators' salaries. Since this may not be possible for smaller companies with one-position switchboards, a way must be found to provide the new service for these potential customers at rates that will encourage them to use it.

•

The Bell Telephone Laboratories have recently taken out a patent on a new device that will accept credit cards and may, in the future, afford personal credit over public telephones. The credit cards, made of pasteboard and with printed electric circuits, are encased in plastic. Small holes in the plastic permit electrical contact to be made when the card is inserted in the new telephone unit, thereby automatically recording the credit number of the caller for billing purposes.

Either public or private telephones could be adapted to the credit card system, but in the use of pay telephones, coin collectors would have to be disconnected. However, use of the new credit card units would require a lot of changes in central office equipment, and for this reason, no plans have been made for their use in the near future.

•

A new load-dispatching system tying together a communications network controlling nearly one million kilowatts for the Florida Power Corp. was recently cut into service at St. Petersburg by the General Telephone Co. of Florida. This network takes part in controlling power distribution over 27,000 square miles of the state, and provides immediate communication by telephone, microwave, radio or power line carrier, with immediate inter-connection of all three to assure the public of uninterrupted power for all emergencies.

The system was tailor-made for the Florida Power Co., which required a dispatching system to handle up to 60 lines, including direct dial access to its microwave circuits, and complete flexibility of inter-connection between PABX, microwave and telephone company private-line circuits. Special 60-line turrets were custom-made by Automatic Electric to meet these requirements.

The new system permits a call to be placed from one of the 15 locations in the load dispatching station to any other by using the 16A intercom, and simply dialing a two-digit number. If the line happens to be busy, the caller can hold on and will be answered when the line becomes vacant. This system gives dial tone, busy, and a common signal at all locations.

A special device known as microwave selection equipment was engineered to handle the five special 60-line turrets, nine Call Commanders and a 30-button Call Director, used in the system. By depressing a button on the Call Commanders or Call Director, direct access to any of the microwave circuits throughout the state is provided.

The custom-made turrets are equipped with 60 three-position keys, plus a hold button. With these turrets, any of the up to 60 lines to be terminated by the power company may be answered. Calls are handled from all local power stations, from direct telephone lines and private lines.

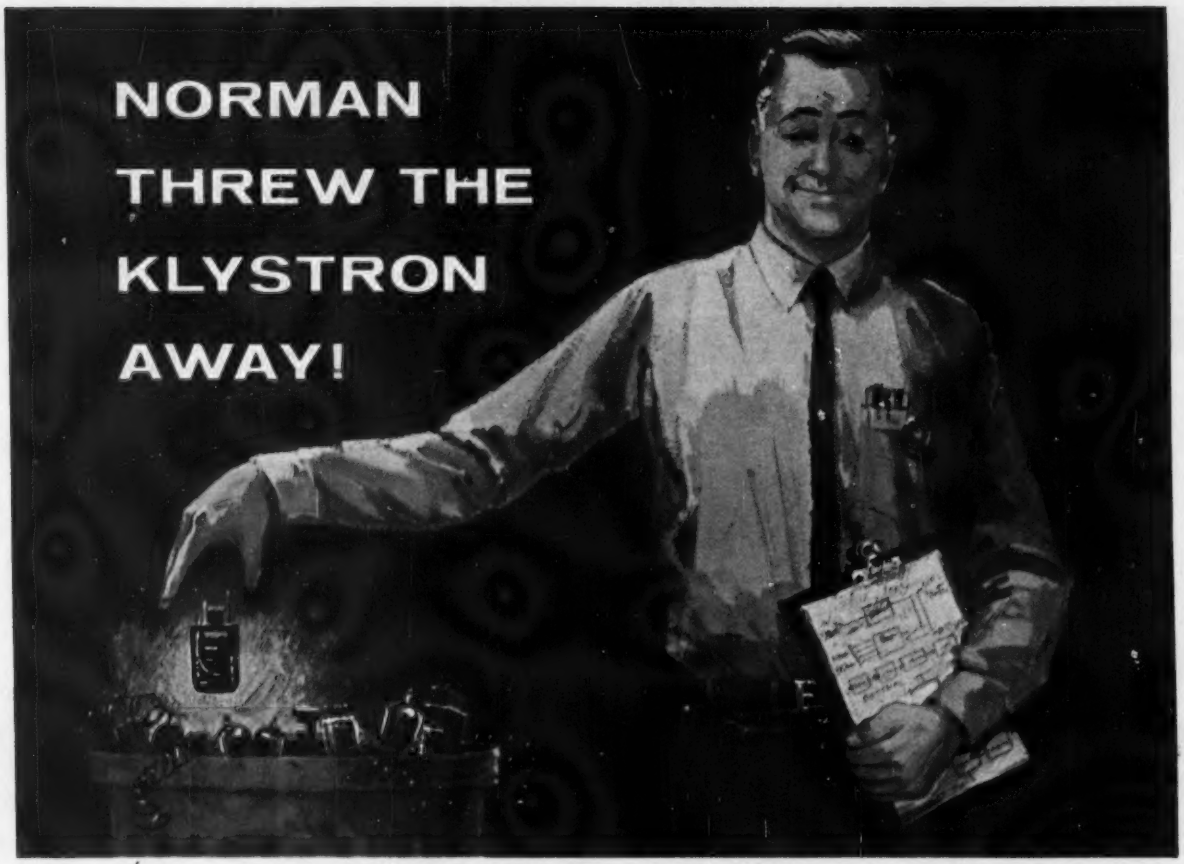
•

A new "Telecommunications Dictionary" will prove invaluable to anyone involved in communications. This 96-page, soft cover book may be purchased from TELEPHONY for $1.50.

This inexpensive, compact book defines more than 2,500 terms in the fields of telecommunications and data processing. With the rapid growth and accompanying interest in telecommunications and data processing, there has developed an increasing need for a knowledge of the terminology of these fields. This has been a problem not only for those just entering these fields, but also for those already active.

Much confusion has been caused by words and terms which have several different meanings. This dictionary defines all the multiple-meaning terms —some terms having as many as seven

(Continued on page 36)



(When he says "TOTAL SOLID STATE MICROWAVE" he really means it!)

Norman is our Chief Microwave Engineer and he, with his team of designers, has overcome the last hurdle in the development of RCA CW-60 Total Solid State Microwave Equipment. Not only have they tossed out the *klystron*, they have also eliminated heat sinks, plungers, high voltage power supplies, motors, blowers, AFC loops, level stabilizers and other critical components that are subject to frequent outages. Instead of headaches, the CW-60 provides crystal controlled heterodyne repeaters, extremely low power drain, high channel capacity, and less floor space (a complete repeater station is housed in half a rack).

Find out what this new microwave equipment can do for you in your operation. Get the complete CW-60 Microwave story from your nearest RCA Microwave Representative; or send the coupon for specifications:

RCA Microwave
Bldg. 15-4
Camden 2, N.J.
WOodlawn 3-8000

RCA Microwave
Merchandise Mart Plaza
Chicago 54, Ill.
467-5900

RCA Microwave
7901 Carpenter Freeway
Dallas 7, Tex.
MElrose 1-3050

RCA Microwave
1560 N. Vine St.
Hollywood 28, Cal.
HOllywood 9-2154

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RADIO CORPORATION OF AMERICA
Microwave Equipment, Dept. JC-189
Building 15-5, Camden 2, N.J.

☐ Please send me the new CW-60 Total Solid State Microwave Brochure.

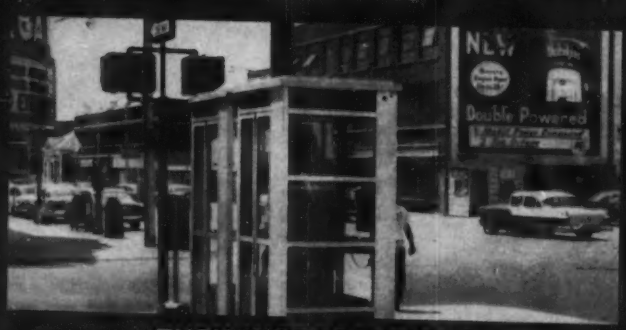
NAME_____ TITLE_____
COMPANY_____
ADDRESS_____
CITY_____ ZONE____ STATE_____

People on the move need paystations

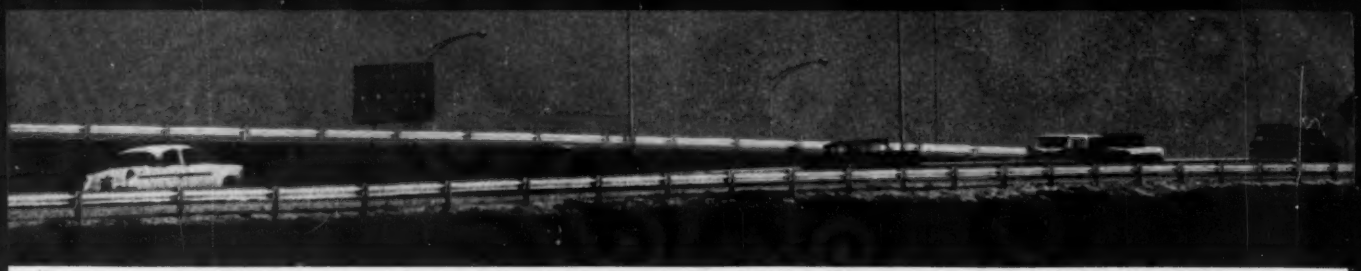
SCHOOLS

COURTHOUSES

SHOPPING CENTERS



BUSY INTERSECTIONS



People need paystations. Take the housewife, for example. She's on the move every waking moment. First, she drives the kiddies to school. Next, she does the family marketing. Later, she visits a sick friend at the hospital. And during her busy day, Mrs. Housewife needs convenient communication. She needs a paystation!

What are the best spots for paystations in your area? It's easy to find out. Write for a free copy of our handy Survey Simplifier. It helps you find the best spots for paystations in your community. For your free copy, just write Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

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different meanings. All terms have been checked against definitions approved by the American Standards Association and for conformity with specialized glossaries published by the common carriers, the Air Force, the data transmission study groups of aircraft companies and the American definitions of electrical terms, published by the A.I.E.E.

Although the "Telecommunications Dictionary" is intended for the primary benefit of those in communications and data processing, it will be of equal interest to anyone working with systems and procedures and methods, and to auditors, office managers, secretaries, executive and management people installing or contemplating the installation of telecommunications and/or data processing equipment. Personnel employed by manufacturers of data processing and peripheral equipment, forms, and supplies will also find this book a real benefit.

•

The first submarine telegraph cable between England and the United States was laid in 1858, less than 10 months after the telegraph was invented. The cable, however, developed trouble just two weeks after having been placed in service. Ironically, communication over it was interrupted during a jubilant ovation for the man responsible for the achievement, Cyrus W. Field.

Field, however, continued to pursue his dream, and in 1866, another cable proved to be more successful. Today, undersea telephone cables and microwave supplement telegraph cables to unite the two nations.

•

Dial-to-Life, a new telephone service sponsored by the American Cancer Society in the Detroit, Mich., area has received a tremendous public response. During the first 24 hours this service was in operation, more than 5,000 persons dialed 872-4666 to hear a recorded message by a physician relating life-saving information on a major form of cancer peculiar to women. This form of cancer is curable, if detected and treated in time.

The *Michigan Bell* provided 15 lines for this new service. An Electronic Secretary answering device plays back the recorded message to callers. The message is changed each month.

•

"Cross Talk"

Practical jokers often lose friends and never eliminate an enemy.

•

Will power is defined as the ability to eat just one salted peanut.

Plant Man's QUIZ

By RAY BLAIN, Technical Editorial Director

Q. Is it true that an unarmored submarine deep-sea cable is now available for carrier telephone use?

A. Unarmored type deep-sea coaxial cable, with the strength member placed inside the inner conductor and with an external plastic sheath, was proposed back in 1951 by the British Post Office.

This type of cable provides increased circuit capacity and permits the laying of repeaters in rigid housings for two-day operation. After development and trials, this new type cable was selected for the deep-sea sections of the Canadian transatlantic telephone cable, as the first link in the proposed Commonwealth System cable that will reach around the world.

•

Q. What is the maximum loop length permissible for rural subscribers served by buried plant?

A. The most recent REA specifications limit the length of these loops to 1500 ohms. This does not include the battery feed resistance or the resistance of the telephone set. It does, however, include load coils and saturable reactors. These specifications further state that this limitation is necessary in order to assure adequate transmitter current in the telephone set and also adequate current to operate saturable reactors, when used, without appreciable distortion or noise.

Preliminary studies indicate that the 1500 ohm limitation will not result in appreciable economic penalties. In some instances, where a few long loops are involved, it may prove more economical to utilize a second 3-pair 19-gauge cable buried together with a larger 22-gauge cable to realize the lowest cost system and still meet the 1500 ohm objective.

The question may also be asked as to why this 1500 ohm limitation should not be placed on open wire facilities. Studies to date have indicated that this 1500 ohm restriction is not necessary on open wire because of the different transmission characteristics of these type facilities.

•

Q. Should the support wire of multipair distribution wire be grounded?

A. REA specifications state that in all situations, the .109-190 support wire should be effectively grounded. On separate pole lines, and on pole lines with open wire circuits, ground the support wire at least four times per mile of line at approximately ¼-mile intervals.

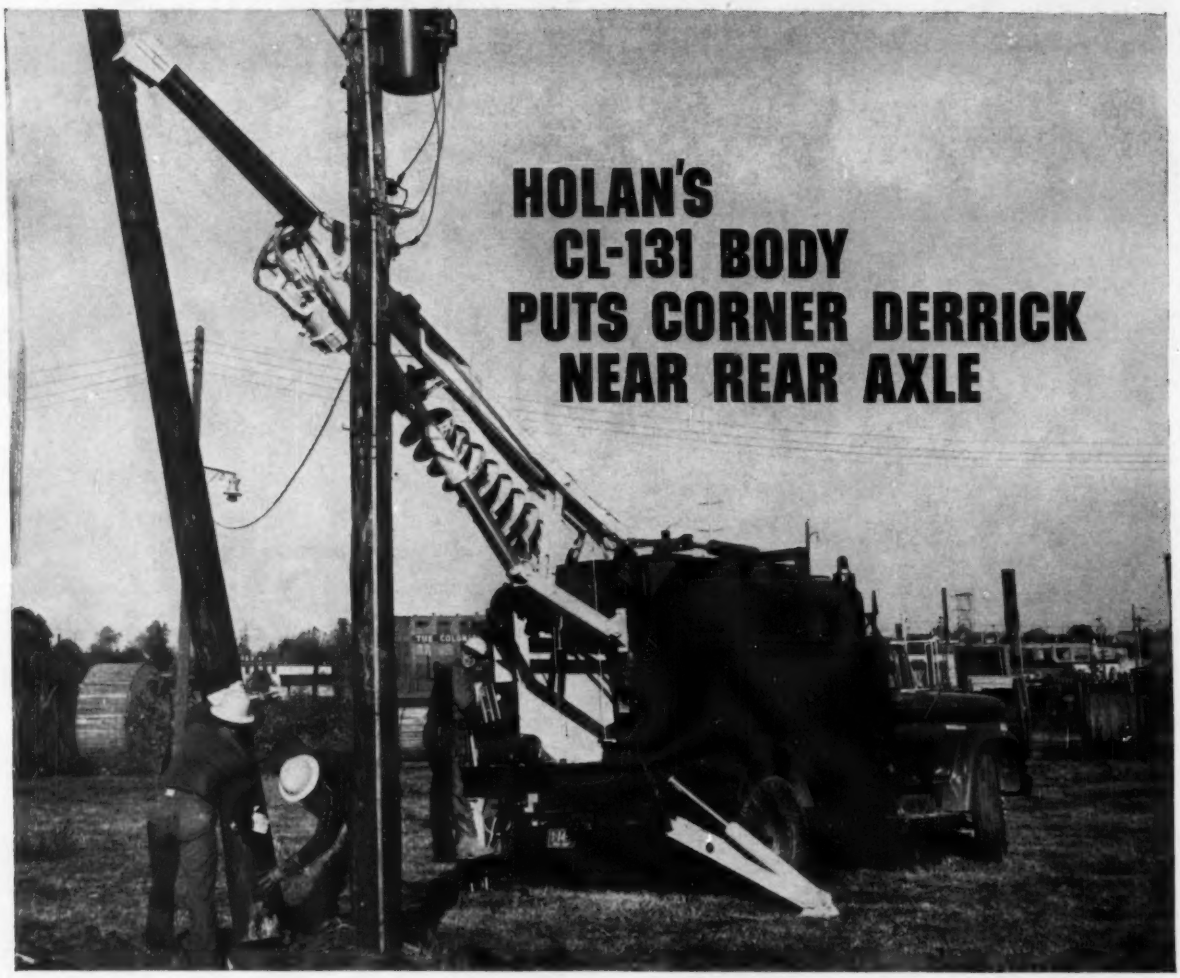
If vertical pole ground wires connected to low-resistance electrodes are not readily available, the support wire may be bonded to a pole ground assembly by means of a No. 10 AWG copper wire in areas where there is little likelihood of lightning damage. In areas where the likelihood of lightning damage is greater than average, some expense over the cost of ground rod installations is justified, to obtain lower-resistance ground connections. Trenching, or even aerial ground wires, should be used to reach a common multigrounded neutral or other low-resistance electrode.

When the support wire is well grounded, it provides a convenient method of obtaining a common grounding conductor for protection devices. If frequent low-resistance grounds are available, such as the common multigrounded neutral of an electric distribution line, foreign current surges on the distribution wire conductors can be transferred to the support wire and then to ground.

•

Q. What are drainage units, and how are they used on a line?

A. Drainage units are used on open wire telephone lines to limit voltages due to electrical induction from parallel electrical systems. These units usually consist of balanced resistor-capacitor or inductor-capacitor networks connected from each side of the telephone circuit to ground.



HOLAN'S CL-131 BODY PUTS CORNER DERRICK NEAR REAR AXLE

New Unit Mounts on 84" Chassis, Yet Stable Enough for Pole "Walking"

Holan's new CL-131 Body/7500 Corner Derrick Unit is a husky little heavyweight.

Short and compact, the body mounts on an 84" CA chassis — and the centerline of derrick rotation is less than 44" from the centerline of the rear axle. By "bobbing" off the rear, the center of gravity automatically shifts forward, making it possible to handle heavy derrick work with or without use of the hydraulic stabilizer jack.

In fact, long and hefty poles can be "walked" to position with the unit, set and aligned without use of pike poles.

And the compartmentation is ideal for light line construction or maintenance. On the right side, there are shelves with adjustable partitions, compartments for ropes and climber belts, a water cask, a thru box for long tools, a crosscut saw holder, and a rubber goods box in the superstructure that opens to the inside of the body.

On the left side, there is a horizontal compartment with drop doors and full-length shelf partitioned for miscellaneous equipment. And there's a left-hand lower box for heavy tools.

Here is a compact workhorse of a unit . . . one that will save time, maneuver easily and do a multitude of line construction and maintenance tasks. Call your Holan Field Representative . . . or write us today . . . for complete information.

"Walking" a pole is an easy task for Holan's CL-131/7500 Corner Derrick Unit which mounts on an 84" CA chassis.

Holan Corporation, 4100 West 150th Street, Cleveland 35, Ohio

Holan

Subsidiary of THE OHIO BRASS COMPANY

HOLAN

Pin-up of a telephone shopper

How does this young mother take such good care of baby and still get her shopping done? No secret—she shops by phone. Diaper and clothespins may keep her from the store but they can't keep her from phoning in her order.

A lot of women can profit from the same hint. That's why we've made it the subject of an ad to run in Ladies' Home Journal, Good Housekeeping and Parents' Magazine. Not many mothers will miss it.

Because this and other shop-by-phone ads increase calls to stores, they benefit telephone companies everywhere. To derive extra advantages from this advertising, consider similar ads for your own area and encourage stores to do the same.

Bell Telephone System

THE TRAFFIC PAGE

By WINNIE BURNETT

Lady Luck, like most any lady, smiles upon those who seek her. A remark frequently heard is, "She was just lucky," or "He is the luckiest person—he just stumbles onto more good ideas." The truth is that the lucky person was searching for an idea or an inspiration and stumbled onto a good one. Luck is rarely ever a "just happened" thing, although frequently an illuminating lucky idea comes to us while we are hunting for something else.

Madame Curie and her husband "stumbled" upon radium while she was studying the problem of why uranium seemed to shed light rays. After many frustrations and countless tests, they got on the trail of a mysterious thing they called radium. So, their "luck" came after years of perseverance—dedicated and unswerving.

Boners and boo-boos may turn into lucky accidents—if we have our eyes and mind open and alert. If we are trying for one thing and the result is something else, we should study the result—it may be more exciting or desirable than what we were trying for in the first place. It is said that the formula for the marvelous Duco paint was discovered by accident. It seems that one of the chemists accidentally let some material he was working with stay in the heating oven overnight. The result of this boo-boo—Dupont's Duco Paint.

However, most ideas are come by after diligently hunting for them. We can make our own lucky breaks, usually by forcing the breaks. It takes driving power and perseverance. Most ideas are step-by-step products. Old-fashioned *effort* not only produces results, but we usually feel better, mentally and physically, for having made the *effort*. Intelligent effort is a requirement for achievement.

To be sure that our efforts are intelligent efforts, we need to constantly seek means to educate ourselves. Education may not be a panacea for our world of today, but it can temper the quality of our thoughts and actions. Education by formal schooling develops us by systematic theories and methods of training and teaching. But we must continue the process of training and developing our knowledge, for certainly the socialogical and technological changes in our world do not come to a halt just because we have finished, by choice or otherwise, our formal education.

Our native talents are supposedly inherent and will stay with us. Whether that talent will be static or forceful will depend on how we exercise and improve on our native ability. Contentment with the status quo of our life can be a most dangerous pitfall. Certainly such passivity is no mark of leadership ability. Knowledge is not power if that knowledge is made up of inert facts instead of active properties.

Any chief operator or manager needs the ability to think creatively. Perhaps you never thought of the quick-thinking handling of some office problem as being the result of creative thinking. Think about it for a moment —haven't you created your ability to handle situations peculiar to your type of work? Sure you have, step-by-step you have trained yourself to recognize problems and to act promptly in solving them. And step-by-step you help the people who are under your supervision to greater knowledge.

Your text books are the volumes of instructions and your office is your school room. You think up, or literally *create*, methods of instruction that can be clearly understood by the people working in your office. You strive constantly to create a pleasant, cooperative atmosphere in your office. You exert every effort to insure a good tone of service. And five'll get you 10 that if you apply those efforts intelligently, you can be justifiably proud of the results—the results of your creative thinking.

So, don't wait for Lady Luck to look for you. Let's go look for her—a'hunting we will go.

Our pretty red-headed Gal Friday came up with a definition of a clock I fear is widely defined in this way: A clock is something they have in an office, so you can tell how late you wish you weren't in the morning, what time to go out for lunch and coffee breaks before, and come back after, and how long before you can start stopping working by stalling until.

Traffic Quiz

(1) Q. What do the letters PBX mean when they are shown in the Rate and Route Guide, following the called place name?

A. When "PBX" is shown in the Rate and Route Guide, it means that the called place is a locality served by a PBX and all calls to numbers there are completed by the PBX attendant.

(2) Q. Should the route operator include "PBX" when quoting a route if PBX is shown in the Rate and Route Guide?

A. Yes. She should say "PBX" and then quote the route.

(3) Q. If the route operator says "PBX" when quoting a route, how should it be shown on the toll ticket?

A. Enter "PBX" in the "To No." space.

(4) Q. If a customer places a call to

(Continued on page 48)

OVER A QUARTER MILLION AT WORK

Today, more than a quarter million Teletype printers are at work. They are serving bankers, brokers, newsmen, diplomats, manufacturers, insurancemen, spacemen.

These versatile communications aids keep branch offices in close contact with each other and with headquarters . . . collect and distribute weather information . . . flash data to and from computer centers . . . send orders, invoices, bills of lading, reservations . . . and perform a host of other data handling services.

A single Teletype printer can send information to one destination—or to several points simultaneously (any distance)—each receiving a printed record. Can be used with DATA-PHONE and other modern communications services.

Teletype printers are manufactured for the Bell System and others who require the utmost in communications reliability.

For more information about Teletype printers (and punched tape equipment, too) write to Teletype Corporation, Dept. 65F, 5555 Touhy Avenue, Skokie, Illinois.

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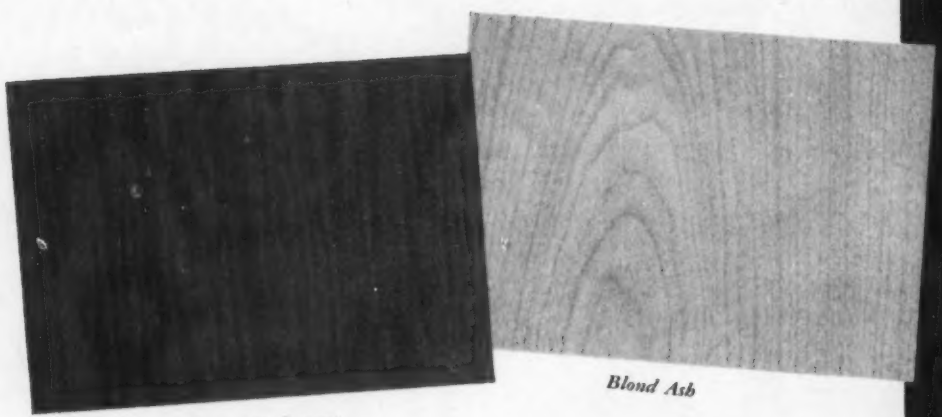
Harmonizes in Any



Webb Walnut ▶

Blond Ash

Brown Mahogany

With Leich's L55 PBX, your subscribers choose any of 3 attractive finishes to match their furnishings.

No matter what kind of office decor he has, your subscriber can harmonize the L55 PBX cabinet with any style of office furnishing. Brown mahogany rings true with the traditional—rich walnut and blond ash strike the right chord for the contemporary theme. And for the most discriminating, there is a handsome plain wood cabinet which can be finished in a perfect blend with the rest of the furniture.

Just one more thought! New panels can be ordered any time to change the L55 to suit restyled offices.

Yes, gone is the old monster cabinet that was off-key with everything. Ring in the *new* with the attractive Leich L55. Write for circular with full details. Automatic Electric Sales Corporation, Northlake, Illinois.

AUTOMATIC ELECTRIC

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GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

Office !

IN THE NATION'S CAPITAL

Continued from page 17

mediately around him, have said time and time again . . . that when business needs a stimulus, an incentive, there should be a tax cut.

"Our President keeps saying this even as he continues and increases the taxes."

As several of the members of Congress said, however, the bill this year received the same treatment it has in the past—discussion and passage. Thus, once more a source of revenue conceived during the time of an emergency continues to drain tax dollars from the American public even though the Korean War ended nine years ago.

The United States Chamber of Commerce told the Senate Finance Committee that the 10 per cent federal excise taxes imposed on passenger fares and communication are out-dated and should be allowed to expire.

In a statement to the committee, the chamber stated these taxes were imposed to discourage "non-essential use of scarce transportation and communication facilities." Today, 20 years later, the chamber said, the taxes are still in force, and although there is an excess of capacity in these services the excises continue to discourage use.

The chamber noted that legislation before the committee proposed to end the transportation tax only. The chamber said the committee also should act to end the taxes on communication services, since the reasons which justify repeal of the transportation tax apply equally to the communication tax.

Telephone Rate Battle

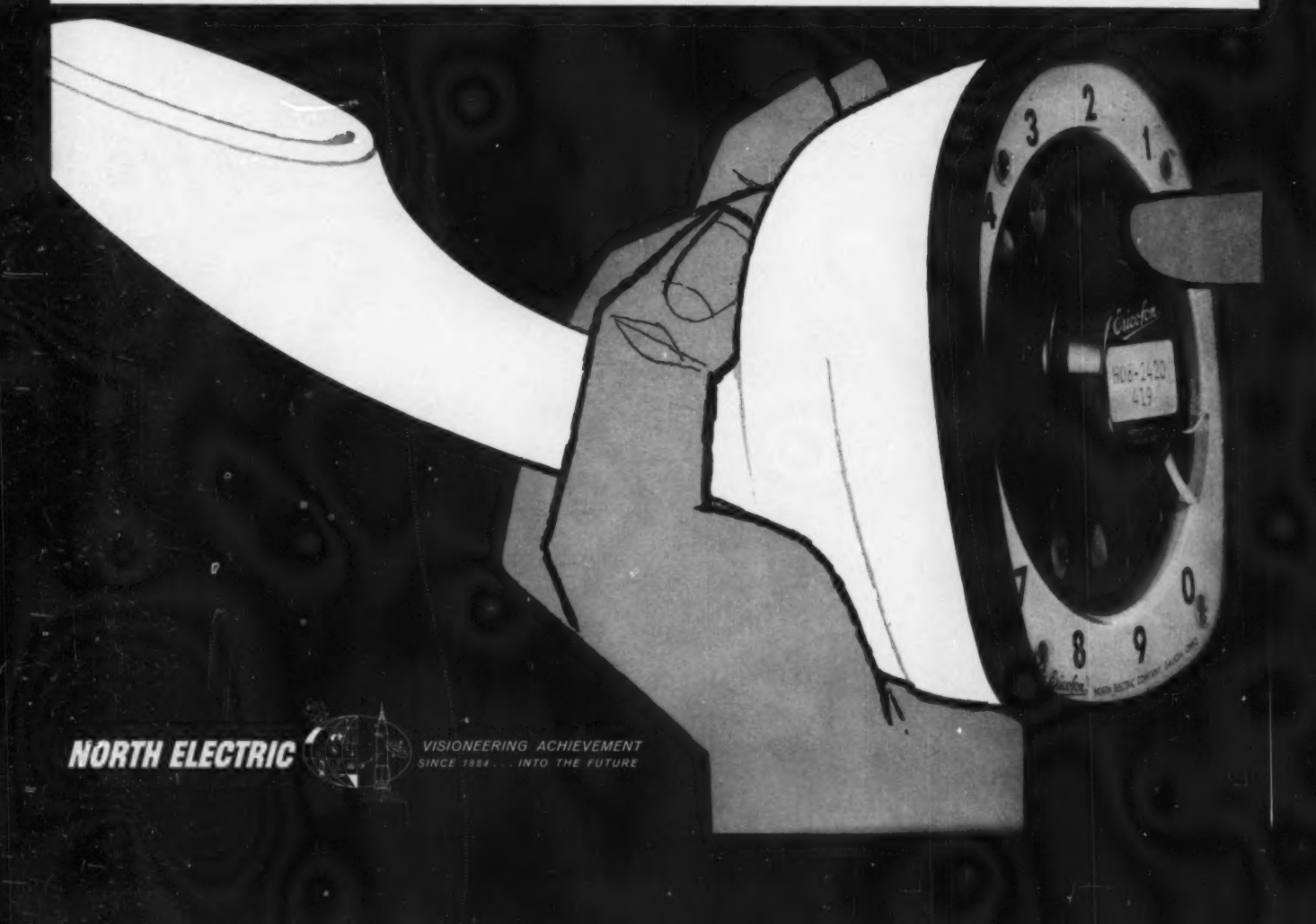
Southern Bell Telephone & Telegraph Co. will reduce rates 1.5 million dollars throughout Tennessee if it wins a lawsuit testing the franchise tax it must pay in the city of Memphis. Memphis city attorneys filed a suit seeking to block plans of the company to pass on to Memphis customers a 5 per cent franchise tax levied by the city. The utility contends that a new Tennessee law requires that the tax be paid by users. The city disagrees. The company paid the city about $1,250,000 last year, representing 5 per cent of its gross receipts in Memphis. If the company wins the suit and the Tennessee Public Service Commission approves, all users in the state will share in the reduction which will equal the amount of the Memphis franchise payment averaging $1.20 per customer.

The city contends it is merely an extension of the existing franchise since all conditions are the same. Memphis rates will be increased 5 per cent July 1. The company will refund the money if it loses the lawsuit. Houston Lighting & Power Co. has been allowed a rate boost of 1.9 million dollars in net annual revenue. The company 20 months ago had asked for a net annual increase of 3.8 million dollars.

Ethiopia Gets Loan

The International Bank for Reconstruction and Development (World Bank) has loaned 2.9 million dollars to a governmental agency of Ethiopia to finance expansion of the African nation's telephone and telegraph system.

The borrower, the Imperial Board of Telecommunications of Ethiopia, will use the money to install more than 50



new exchanges in provincial towns, to add about 1,000 new lines to the Addis Ababa automatic telephone exchange, and to install a new 3,000-line automatic exchange in Asmara.

The Bank of America National Trust and Savings Association, the First National City Bank of New York and the Irving Trust Company are participating in the loan without the World Bank's guarantee to the extent of $128,000, taking notes due in 1966 and 1967. The loan is for 20 years and bears interest of 5¾ per cent. Repayment is to begin in 1966.

Heroism Rewarded With Vail Medal

An Albany telephone man who rescued a scuba diver from drowning in the icy waters of a reservoir last December was given the New York Telephone Co.'s highest award for heroism.

Wrenn D. Sherwood, 35, received the Vail Medal from Clifton W. Phalen, president, at the company's New York headquarters.

Sherwood is no stranger to heroism. This is the second time he has saved a man from drowning. In 1950 he rescued an Albany construction worker, trapped in a cave-in excavation, by racing to a telephone garage for pumps to control the rising water until the man was freed.

The Vail Medal, named for the late Theodore N. Vail, president of the American Telephone and Telegraph Co., is awarded to telephone people who display outstanding courage and resourcefulness in helping others—either on or off the job—or when telephone training has been a factor.

The incident for which Sherwood won the award took place on December 9. He accompanied a friend, scuba diver Ronald C. Higgins, to act as a "safety buddy" while Higgins carried out underwater repair work on a dam at Albany's Six Mile Waterworks reservoir. Higgins became entangled some 20 feet below the surface in submerged debris which ripped the mouthpiece from his diving apparatus. With the aid of two laborers, Sherwood pulled Higgins to the surface.

Then Higgins' oxygen tank caught on a projecting ledge. Sherwood stepped out on the narrow, sloping ledge and, from this precarious perch, lifted Higgins to safety. This was no mean feat, since Higgins weighs 170 pounds, and was wearing some 70 pounds of equipment, all further weighted down by being wet. In bringing him to safety, Sherwood could only use one hand to lift. With his other hand he had to hold on to a window edge for balance.

When brought to safety, Higgins had stopped breathing and had begun to turn blue. Sherwood immediately applied mouth-to-mouth resuscitation until Higgins started breathing and regained consciousness.

Sherwood, a telephone man for the past 16 years, is now working as an installer-repairman in the Northwest District of Albany. He is a member of the Safety-Search and Rescue Squad of Schenectady.

Human Mysteries

I think what has chiefly struck me in human beings is their lack of consistency. I have never seen people all of a piece. It has amazed me that the most incongruous traits should exist in the same person and, for all that, yield a plausible harmony.—SOMERSET MAUGHAM.

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THE OUTSTANDING
North Electric ERICOFON®

. . . just five years old now, and growing in popularity and stature each day.

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Courts and Commissions

N. C. Commission Okays Rate Increase for General

General Telephone Co. of the Southeast was authorized by the North Carolina Utilities Commission June 5 to increase rates at its Durham and Creedmoor exchanges to bring in an additional $180,000 a year in gross revenue. The company, in a petition filed last October 20 and opposed by the city of Durham, had asked increases totaling $424,894.30 (TELEPHONY, Sept. 30, 1961).

The commission in its order said the requested increase would have given the company a 7.39 per cent rate of return on its investment—which it placed at 9.3 million dollars. It said the increases allowed would allow the company to earn a return of 6.21 per cent, which was termed "fair and reasonable."

At the same time, the commission found that "according to the evidence of record in this case, there appears to be just cause for certain of the applicant's subscribers to complain about the inadequacy and inefficiency of the service being rendered."

"We emphatically say to management that in our opinion we are providing in this proceeding sufficient financial means to enable the applicant to improve the type of service it is offering," the order said.

"We insist now that this service be improved, and will confirm the commission's position with respect thereto in a subsequent directive and requirement to the applicant relative to improvement of its service in the area it is authorized to render telephone service."

In approving a portion of the rate increase, the commission also approved an extension of the base rate area at Durham which will eliminate or reduce mileage charges paid by some customers.

Minnesota Commission Okays Rate Increase

The Minnesota Railroad and Warehouse Commission has granted permission to the Mazeppa Telephone Co. to increase rates. The last revision granted to this company was dated August 9, 1951.

The Mazeppa Telephone Co. is planning a rehabilitation which will culminate in the cutover of the present manual operation to dial service on or about July 15, 1962. The telephone exhange at Mazeppa serves approximately 373 stations. To finance this dial conversion, the company has borrowed from a private agency $37,000 at 5¾ per cent interest.

The rate increase will give a ratio of net income to rate base of 4.96 per cent and help defray the cost of the conversion.

The new rates will become effective on the first billing date following the completion of the change over to dial.

New Services for LT&T; Sale, Boundary OK in Neb.

New offerings of PABX service for The Lincoln Telephone & Telegraph Co. were approved on June 5 by the Nebraska Railway Commission, as follows:

(1) Cordless attendant's cabinet, capacity—40 stations, 10 trunks, 2-digit system (Type 40 Leich, All Relay):

Attendant's cabinet, per month	$25.00
Trunk terminals, each, per month	3.50
Links, each, per month	4.00
Power supply and common equipment, per month	25.00
Optional:	
Meet-Me conference (limited to 4 stations, or to 1 trunk and 3 stations), per month	4.00*
Busy lamp field applique	5.00*

(2) Cordless attendant's cabinet, capacity—80 lines, 20 trunks, 3-digit system (Type Leich 80-A, All Relay):

Attendant's cabinets:	
12-trunk capacity, per month	$35.00
26-trunk capacity, per month	50.00
Trunk terminals, each, per month	3.50
Links, each, per month	4.00
Power supply and common equipment, per month	25.00
Optional:	
Meet-Me conference (limited to 4 stations or to 1 trunk and 3 stations), per month	5.00*
Busy lamp field applique, per month	5.50*

(3) Cordless attendant's cabinet, capacity—100-300 lines, 26 trunks, 3-digit system (Type Leich 100T, All Relay):

Attendant's cabinets*	
12-trunk capacity, per month	35.00
26-trunk capacity, per month	50.00
Trunk terminals, per month, each	3.50
Links, each, per month	8.00
Power supply and common equipment, per month	60.00
Optional:	
Meet-Me conference (limited to 4 stations or to 1 trunk and 3 stations), per month	5.00

*No charge for installation of optional features will apply if included with initial installation. If installed after initial installation, charge of $15.00 for each optional feature applies.

•

The Hamilton County Telephone Co. Aurora, and the Consolidated Telephone Co., Denning, on June 7 filed a joint petition with the Nebraska commission requesting permission for Consolidated to sell its stock to the Hamilton company, and to issue notes and mortgages in a principal amount not to exceed $900,000.

•

The Northwestern Bell Telephone Co. and the Wood Lake Telephone Co. have received permission to establish a new exchange boundary between the Cody exchange of Northwestern Bell and the Kilgore exchange of the Wood Lake company. This will extend the Cody exchange into an area in which telephone service is not now provided.

Rochester Telephone Seeks Okay For Debenture Sale

The Rochester Telephone Corp. recently petitioned the New York Public Service Commission for permission to issue and sell 25 year debentures totaling 12 million dollars.

The proceeds of the sale would be used to repay bank loans used for construction and extension of facilities and to retire $3,790,000 of 4 per cent sinking fund debentures due in 1963.

Subject to approval by state and federal regulatory authorities, the debentures would be submitted for competitive bidding about July 19.

During 1961, construction funds were provided from the sale of 273,437 shares of common stock.

File Rate Petition, Service Requests in Mo.

The Northeast Missouri Rural Telephone Co., Green City, on June 6 asked the Missouri Public Service Commission for a rate increase.

•

The Missouri commission, on the same date, received the petition of the Mark Twain Telephone Co., Bethel, to render additional telephone service in Clark and Lewis counties, and for authority to construct and operate a telephone system.

Approve EAS with NW Bell And Set Rates in Minn.

The Minnesota Railroad & Warehouse Commission on June 4 approved the application of the Clear Valley Telephone Co., Inc., Clearwater, for

authority to establish EAS and a schedule of applicable rates, between the Clearwater-Clear Lake exchange and the St. Cloud exchange of Northwestern Bell Telephone Co.

Clear Valley's Clearwater-Clear Lake exchange serves subscribers through 425 company-owned stations. Northwestern Bell has approximately 18,500 stations in its St. Cloud exchange.

General of Illinois Sells $12 Million Securities

General Telephone Co. of Illinois, Bloomington, on June 1 sold privately nearly 12 million dollars of first mortgate bonds and common stock to repay its outstanding indebtedness (TELEPHONY, May 12).

Proceeds of the sale, the company said, would be used to repay 8 million dollars of bank debts, and 3 million dollars borrowed from General Telephone & Electronics Corp., the parent company. The remainder is earmarked for construction.

North Carolina Commission Petitioned for Rate Increase

Laurel Hill Telephone Co. asked the North Carolina Utilities Commission June 5 for permission to increase its rates to bring in an additional $17,541 a year.

The company operates in Laurel Hill and surrounding areas of Scotland County.

Rochester Telephone Plans Debenture Issue

Rochester Telephone Corp. asked the State Public Service Commission for permission to issue $12 million in 25-year debentures.

If approved by regulatory authorities, the debentures would be offered for competitive bidding July 19.

Minnesota Commission Okays Sale of Company

The Minnesota Railroad and Warehouse Commission authorized on June 4, 1962 the sale of the Ghent Telephone Co. to the Tyler Telephone Co. The Ghent Telephone Co. serves approximately 216 stations.

Report Sale in South Dakota

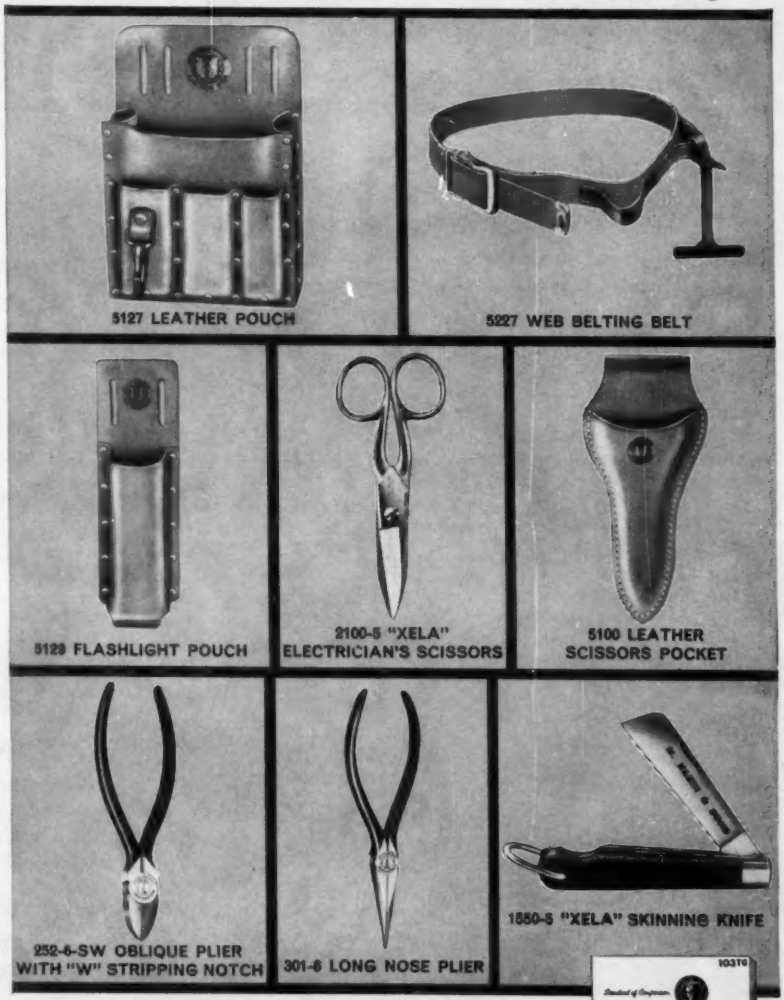
Report of the sale of the Gary, (S.D.) Telephone Co. to the Deuel Telephone Cooperative Association, Clear Lake, S. D., was made on May 21. Sellers were Mr. and Mrs. C. M. Priest of Gary. The new ownership plans modern dial service, expected to be in operation "sometime in October".

KLEIN PREFERRED BY ELECTRICIANS AND INSTALLERS

If you know Klein for pliers, climbers, grips and other tools, you will be interested in the many other products in the complete Klein line, such as those illustrated.

In leather goods, Klein has been supplying the largest utilities for years with tool belts, safety straps, tool pockets and other equipment designed for maximum safety . . . longest life.

Klein knives and scissors are specially designed for electricians and built to stand hard usage.


5127 LEATHER POUCH
5227 WEB BELTING BELT
5129 FLASHLIGHT POUCH
2100-5 "XELA" ELECTRICIAN'S SCISSORS
5100 LEATHER SCISSORS POCKET
252-6-SW OBLIQUE PLIER WITH "W" STRIPPING NOTCH
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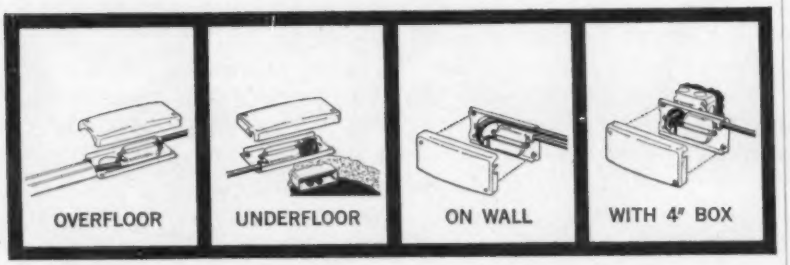

Complete redesign of 2657T Service Fitting gives new advantages as housing for plug and connector. Strong die-cast cover eliminates need for grommets at notch and ingress for cable. Slightly larger size simplifies assembly. Cover bosses ease alignment of cover and base. Phone for more information.

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Special fittings — miters—short lengths—expanded web sections available, also adapters to claytile, transite and fiber duct.

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American Pipe and Construction Co., 518 N.E. Columbia Blvd., Portland, Ore. Tel: BUtler 5-2531
Concrete Conduit Corp., 130-01 Northern Blvd., Corona, N. Y. Tel. ILlinois 7-1515
Chicago Pre-Cast Products Corp., 29W629 North Aurora Rd., Naperville, Ill. Tel: EL 5-2700—2701
Denver Concrete Products Co., 5020 Marshall, Arvada, Colo. Tel: HA 2-4202
Eastern Pre-Cast Corporation, 675 Main St., Tullytown, Pa. Tel: Windsor 9-8750
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J. E. Evans Concrete Products Inc., Cleveland, Ohio. Home Office: Indianapolis, Ind. Tel: WAlnut 5-5301
J. E. Evans Concrete Products Inc., Shelbyville, Ind. Tel: WAlnut 5-5301
Neff Concrete Products Co., 711 Section St., Danville, Ill. Tel: Hickory 6-1016
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CONDEX

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GRAUER GRADUATES

Concluded from page 18

community standing, and his need for financial assistance.

The scholarship is awarded to an applicant who is not receiving additional scholarship support from, or is having his expenses paid by, a company.

The winner receives the $500 award for each of his two years at Southern Tech, provided he maintains a minimum grade average of B.

For further information and application blanks for the scholarship, applicants should write to the Southern Tech registrar or to:

J. P. Goodwin Jr., Head
Electrical Department
Southern Technical Institute
Clay Street
Marietta, Georgia

The Telephone Technology course is taught by the department of electrical technology at Southern Tech. The student receives what the institute describes as a rigorous training in mathematics, physics, and the humanities, as well as basic electrical and electronics subjects before he begins the specialty courses. These specialty courses include:

Outside plant
Central office equipment
Traffic
Carrier systems
Interference and protection
Telephone systems technology
Radio and microwaves.

Graduates of the two-year course receive an Associate in Science degree in Electrical Technology, Telephone Option.

TRAFFIC PAGE

Concluded from page 40

a locality which is served by a PBX and he gives you a number, would it be considered a person or station call?

A. It would be considered as a "Person" call. If it seems appropriate, explain this to the calling party.

(5) Q. How should the information on a PBX which serves a locality be shown on the toll ticket?

A. Enter "PBX" in the "To No." space and the extension number or name in the "To Per." space. For example, on a call to Eglin Air Force Base, Florida, 2358, enter "Eglin Air Force Base" in the "To P1" space, "PBX" in the "To No." space, and "Ext. 2358" in the "To Per." space. Enter any other information pertinent to the call in the usual manner.

ABC OF TELEPHONE

Continued from page 21

Delco-Remy distributors also use felt discs under the breaker plate. Apply two or three drops of SAE 20 motor oil through oil holes in the bottom of the breaker plate or at each of four places around the outer edge of the breaker plate. Be sure to wipe away any excess oil.

Shaft bearing—Most shaft bearings are lubricated with an oil cup, grease cup, or grease fitting.

SAE 10W or SAE 20 motor oil is usually recommended for bearings equipped with oil cups.

Grease cups should be turned until a slight resistance is felt. Refer to the manufacturer's specifications on the rate occasions when the grease cup requires refilling. No. 2 cup grease is often recommended.

Apply lubricant to great fittings at low pressure, slowly and sparingly. A vent hole generally is provided to permit the escape of excess lubricant.

Testing the Distributor

The distributor must function within very close limits. A few thousandths of an inch off in creating the spark required at a precise time in the cylinder can mean miles of difference in economy in driving.

Precision accuracy in adjusting the distributor can be assured only by tests made under actual operating conditions. Some distributor testers enable the distributor to be tested on the engine. Other testers require it to be removed. The tester simulates the operation of the engine in these instances. Some of the important tests that can be completed in a few minutes with a distributor tester are:

- Contact dwell in degrees for proper breaker point closure. (Individual type dwell meter is shown in Fig. 4.)
- Point creepage.
- Shorts or grounds in breaker plate and points.
- Cam shaft and bushing wear.
- Vacuum spark control.
- Automatic spark advance.

All of these tests are important to efficient distributor operation. However, the correct operation of the vacuum advance unit may be the most critical from the economy maintenance standpoint. Actually, any of the tests

DATE

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on your TBM Miti-Mast Service Entrance Masts. Immediately.

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COMPANY

ADDRESS

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The TBM *Miti-Mast*

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offers these advantages

- Fast installation using ground sleeve . . . in less than an hour.
- A money-saver . . . you save up to 2/3 over the cost of make-shift installations.
- Gives a better appearance.
- Attracts attention, increases revenue.
- Develops better company image.
- As easily removed as the booth to any new location.
- Long-lasting . . . made of heavy-gauge steel tubing.

Sounds good . . . and it is! Hundreds of satisfied customers. *Use the coupon above and get all the facts.*

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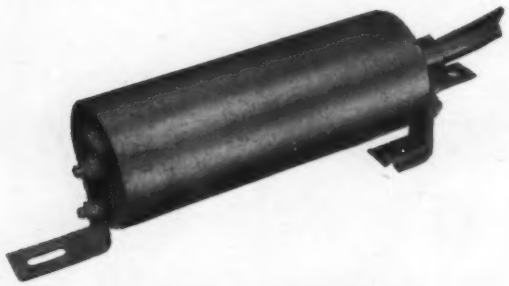
CEECO TYPE C125
GALVANIZED STEEL CASE ASSEMBLIES
FOR AERIAL (POLE MOUNTING).
CONTAINING FOUR TO FOUR HUNDRED SIXTY UNITS.



- LEAD STUB ASSEMBLIES ARE PRESSURIZED
- PLASTIC STUB ASSEMBLIES ARE SEALED IN THERMOPLASTIC COMPOUND TO INSURE PROTECTION FROM MOISTURE.

These assemblies can be equipped with loading coils, capacitors, inductors and MF units.

Write us for assistance on your loading problems.

CEECO Loading Coils are sold by your telephone equipment supplier.

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LADDERS
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SAFETY
...in this complete **free** file catalog

Whatever your ladder needs ...here's the catalog that provides you with all information on the most versatile, complete line on the market. Steps, extensions, convertibles, scaffolds, special ladders—in aluminum and wood are all fully illustrated, explained, priced. Includes information on ladder care. Send for your free copy.

EXAMPLE:
TYPE L ALUMINUM EXTENSION
Light, strong, easy-to-handle...available in 1, 2 or 3 sections.
24 Ft. Extension $92.00

DUO Safety

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could uncover trouble directly related to efficient, economical engine operation. The important point is the engine would run and performance would be good, but fuel economy would be reduced quite substantially if the vacuum advance unit is not functioning properly.

Cam angle or contact dwell is the number of degrees the distributor cam travels during the time the contact points are closed and the ignition coil is energized. The cam angle is variable, depending upon the specific engine distributor combination. For example, specification of a 36° cam angle for a six-lobe cam means the cam rotates 36° between the closing and opening of the contact points.

The distributor points would be open for a period of 24° of cam rotation for a 36° cam angle because the rubbing block on the contact arm rides on the peak of the cam. The cam travels through 360° in making a complete revolution. Thus, to fire each of six cylinders during a single distributor rotation means that only 60° of rotation is available to fire each cylinder. In a similar manner, only 45° is available for each cylinder in an eight cylinder engine, equipped with an eight lobe cam.

Breaker arm tension should also be in accordance with the manufacturer's specifications. Too little tension will result in too little pressure against the contact points. This can cause misfiring because of contact bounce or chatter. Too much pressure may cause excessive contact point wear.

Breaker arm spring tension is measured with a spring scale calibrated in ounces. The scale is hooked to the breaker arm as close to the points as possible. The pull on the arm should be at a right angle to the face of the contact point. The reading should be made at the moment the contacts separate. A small test lamp can be connected in series with the contacts during this test. The scale is read when the test lamp goes out, indicating the contact points have opened.

The breaker arm should be replaced if the spring tension does not fall within the limits specified by the manufacturer.

Seek Higher Standards

"Men learn by example. Let us then direct as much attention as possible to the perfection 'of a government of the people, by the people and for the people.' Let us remember the words of Lincoln when he said, 'You can fool all the people some of the time, some of the people all of the time, but you cannot fool all of the people all of the time.' "—Altoona, Pa., *Mirror*.

WISC. CONVENTION

Continued from page 29

he termed "food for freedom", which would be administered by U.S. Armed Services. Instead of curtailing farm surplus, he recommended, the U. S. government should appropriate one to 2 billion dollars a year to buy these surpluses and distribute them to the needy of the world.

Orville P. Deuel, chief, rates and research department of the Wisconsin Public Service Commission, in his talk, "State Regulation of Telephone Rates", observed that there is an increased need among telephone people for ability to explain the full range of service and facilities that are available, and he added, "The advent of a variety of telephone instruments and service arrangements has created a certain elasticity in the market. This can be traced to the advertising done by the industry, and customer-demand backed by improved buying power."

Difficult to Agree

Noting that the duty to serve at reasonable rates is an important item on which all can agree, he reminded his listeners the meaning of "reasonable" may be more difficult to agree upon. Mr. Deuel's view is:

"Reasonable rates should meet the test of not exceeding the value of service to the subscriber, and should meet the test of reasonable earnings for the investor. If both tests cannot be met, it becomes the problem of management to alter the method of operation so that the two can be brought into alignment, and it is part of the job of regulation to encourage management in that direction. One suggestion would be to give consideration to instruments of regulation such as our publications showing comparative rates and comparative costs. Rates should at all times be reasonable in relation to the value of service provided.

"Requests for reasonable rates are granted by the commissions, and in most cases it would be unlawful for a commission to do otherwise. I have observed that in many rate cases there may have been a compelling urge on the part of those who prepared the case to overstate their cases for higher rates. Where this occurs, the utility has pleaded guilty to a lack of understanding of the public utility concept as it relates to reasonable rates.

Dispel Myth

"Perhaps the myth that a case might

NEWS for cable users!

KENNECOTT-OKONITE EXPANDS

its telephone cable facilities with the most modern cable-making and testing equipment. This will place us in a position to offer a complete line of thermoplastic and paper-insulated-

KEN-TEL CABLES

including Alpeth and Stalpeth Types

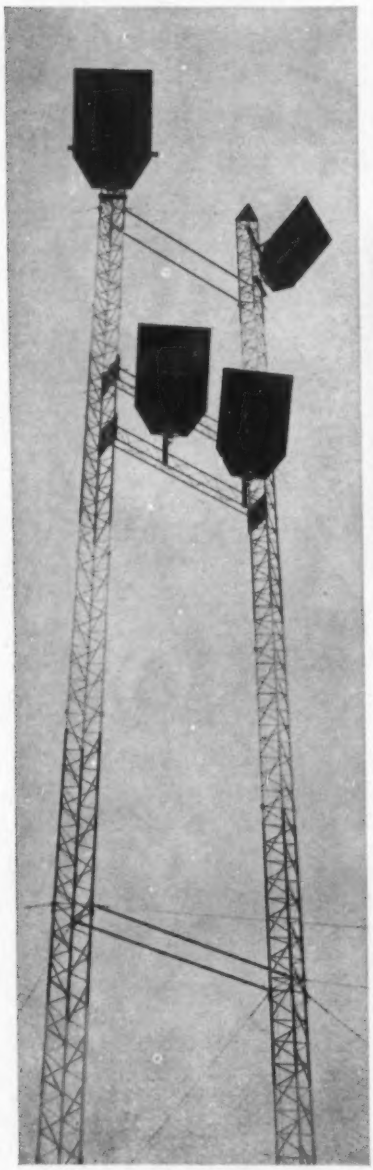
For over 60 years, telephone engineers have confidently specified and used Kennecott's paper-insulated, lead-covered telephone cables. Now they will be able to specify a complete Ken-Tel product line, which will include Alpeth-sheathed, thermoplastic-insulated constructions and Stalpeth-sheathed, paper-insulated designs.

This complete line will be in production in a matter of weeks.

Now is the time to discuss your telephone cable requirements with your Kennecott-Okonite representative and to place and schedule your orders for summer and fall delivery. Technical data is available immediately from your district offices or by writing direct to: Kennecott Wire and Cable Division, THE OKONITE COMPANY, Phillipsdale (Rumford 16), R. I.

KENNECOTT-OKONITE TELEPHONE CABLES

ROHN MICRO-WAVE TOWERS



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be overstated so that something less than requested may be granted persists, but a search of the records of cases before the Public Service Commission of Wisconsin should dispel any such notion.

"One point of honest disagreement may be in the estimate of future revenues. Management often, and properly so, is pessimistic, but regardless of such pessimism as to revenue, it should be remembered that the plans for expansion to meet growth in all cases must harmonize with the estimated revenue.

"Realistic revenue estimates demonstrate an understanding of the public utility concept. Failure to accomplish such realization could lead to abandonment of the 'going level' concept and to reliance upon past records."

Among convention personalities in the limelight during Wisconsin convention was Donald G. Mitchell, director of General Telephone & Electronic Corp., New York City, who was guest of honor at the association's stag party. Steve Holum, left, of Mt. Horeb, and chairman of golf tournament committee, was his dinner partner.

Mr. Deuel listed the following four immediate objectives for 1962:

(1) Continuation of the extension of extended area service where there is sufficient demand in order to eliminate the expense of a short-haul message toll service, and to eliminate problems of subscribers asking to transfer from one exchange to another.

(2) Recognition of the idea that the colored telephone may be approaching the status of a standard piece of equipment.

(3) Continuation of the long established trend toward fewer telephones on a line as far as practicable.

(4) Acknowledgment of the fact that we are witnessing the beginning of the end of the old rural multiparty line.

Cuban Ambassador

A former Cuban ambassador to Great Britain, Sergio Rojas, told of "Cuba—The Great Communist Conspiracy". He observed that the choice of a speaker on such a topic showed "you are highly responsible citizens of the world".

Many United States citizens, Mr. Rojas said, are good salesmen, but in the field of politics, they don't do a good job of selling their political system. He explained that many Latin Americans believe the U. S. people are exploiters, etc., because the Communists have sold this line for years.

Mr. Rojas stated the lastest Cuban revolution is part of a world-wide Communist conspiracy against the U. S., the center for freedom and bastion of capitalism. As Russia carries forward its strategy of encirclement, Cuba is its big opportunity to gain a base in the Western Hemisphere, following attempts in other countries, such as Brazil, Mexico, Chile, Bolivia and Guatemala.

In tracing recent Cuban history down to and through Fidel Castro, Mr. Rojas said Castro welcomed Communist support when he was getting started, but recently, because the Communist apparatus was more efficient, Castro became a prisoner. Meanwhile, Castro has used the U. S. as a scapegoat for his troubles.

As he closed his talk, which was followed by a number of questions from the audience, Mr. Rojas underscored the importance of Latin America in world affairs by citing the forecast that in the year 2000 the U. S. population will be approximately 300 million while Latin Americans will number 600 million.

Two attractve Wisconsinites snapped at recent convention were Mrs. Paul Parsons of Rhinelander (left), and Mrs. J. F. Benjamin of Cumberland.

Re-elect Directors

The following directors were eligible

for a second three-year term and were re-elected:

Phil Bigley of Viroqua; Allan C. Brown of Rhinelander; Gilbert A. Karcher of Burlington; H. L. Olson of Weyauwega, and R. G. Peterson of Wittenberg.

Other directors are:

Harris G. Allen of Milton Junction; E. L. Beyl of Osceola; Tony M. Gotstein of Casco; George F. Griffin of Amery; D. H. Hansen of La Crosse; J. H. Hesselman of Mondovi; J. F. O'Connell of Madison; G. A. Rutenbeck of Milwaukee; H. M. Smith of Neillsville, and Howard Teasdale of Sparta.

The directors elected these officers: President, Mr. Bigley; vice president, Mr. Griffin, and executive vice president, Ray J. Riordan of Madison.

Georgia Company Installs Flashing Lights on Booths

The Standard Telephone Co. of Cornelia, Ga., reports the Gainsville (Ga.) *Daily Times*, has installed small blue flashing lights on top of its street telephone booths, a procedure which has attracted considerable attention in Cornelia.

The explanation is that in that town, says a spokesman for the maintenance department of the telephone company, there have been fogs lately, and it was felt that the Attracto Lights would guide users to them through murky weather.

The General Telephone Directory Co., of Des Plaines, Ill. has announced the election of John D. O'Neil to the office of vice president and controller. Mr. O'Neil will continue his duties as secretary. He joined General Telephone Directory Co., in 1948 after receiving a B.S. degree in accounting from the California College of Commerce.

A LITTLE SOMETHING FOR ALMOST EVERYBODY

or How to succeed in communications while keeping ahead of the Joneses

SOMETHING unusual about Lynch is that it can deliver communications equipment to solve problems for just about everybody . . . from the big operator to the little fellow who's trying to run a modest-sized business in a toe-to-toe market.

WELL, here's the hottest new item that Lynch has turned out for quite a spell . . . a *microwave multiplexing system* that's just about right for everyone—Telephone Company, Utility, Railroad, Pipeline, Military, etc.

WE'LL call it the B910 (because that's what a Lynch secretary assigned as a model number), and we suggest you might give some consideration to this feature:

THE B910 is inexpensive to buy, inexpensive to expand and inexpensive to maintain. It uses a minimum of common equipment . . . and this in itself is quite uncommon. You can start with as few as one channel (that's as few as they come) and build up to 600, with no penalty whatsoever.

WE don't mind telling you: 120 channels of B910 (that's ten 12-channel groups) can be applied directly to the microwave radio equipment without any complicated gadgets . . . and with no supergroup equipment either. The Lynch filters turn the trick . . . and each channel has built-in oscillators for modulation and signaling. Think what that means when there is an indication of oscillator failure (a remote possibility, but our individual oscillators are subject to the same conditions as expensive master oscillators). You're still on the air with all the other channels!

WE don't mind telling you: Transistorized construction gives you all these familiar benefits (not so familiar if you're still using vacuum tube equipment): small size, light weight and less heat, longer component life. Think of all the beer you can buy with the money you save on the low power consumption and lower maintenance cost. You know *that* story . . . and the Lynch B910 makes it non-fiction.

AND, we don't mind telling you: Lynch's well known knack with filter systems, designed into the B910, relieves you of the cost of intermediate supergroup modems and other common equipment, avoids expensive hybrids, provides options for easy drop and reinsert configurations and, of course, sounds best (you can actually recognize the fellow on the other end). The Lynch B910 can't overload the microwave system, because it utilizes single-sideband, suppressed carrier transmission. Among the L-E-T-T-E-R-S the B910 works with are CCITT, the indomitable W. E. "L" (we have two orders from them, incidentally) and some others, if you'd care to guess (we have lots of options).

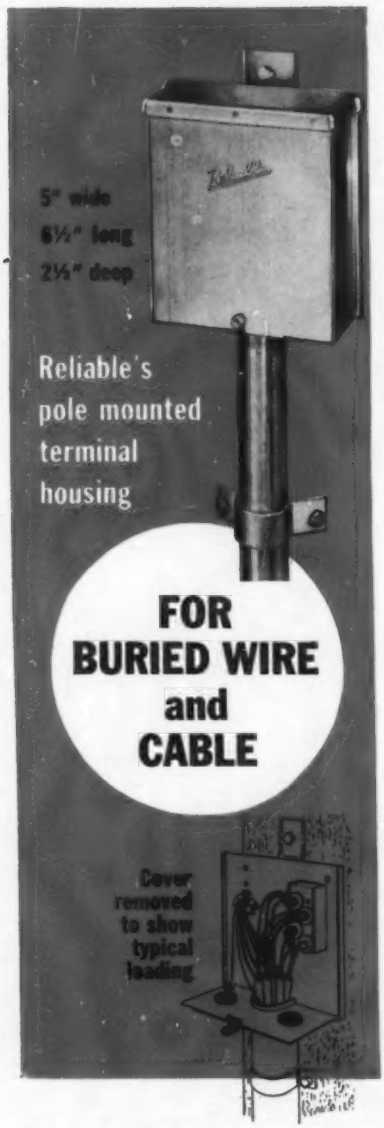
AND if that's not enough, the B910 has been producing toll revenue for over a year . . . longer than any other similar transistorized system in the country. You may have heard that it is operating over a 1400 mile pipeline system; and that it is providing communications between some islands in the South Pacific via a scatter radio system.

IF you're in the communications business and not currently using two tin cans and a string, we suggest that the Lynch B910 can do the best possible job of solving your particular problem at the lowest cost. It won't hurt you a bit to start on a budget and grow as the Joneses move into the neighborhood and order new service. If Mr. Jones happens to work for W. E. or one of those other big outfits, you might give him our number. What Lynch can do for you, it can do for the Joneses, too.

Lynch **LYNCH COMMUNICATION SYSTEMS INC.**

Dept. A616 695 Bryant Street, San Francisco 7, California • Area Code 415 • EXbrook 7-1471

Contact your Graybar Representative or call us direct for complete information.



The heavy aluminum housing is designed to accommodate a variety of wire terminal blocks and protectors. It has a sliding cover on an L shaped back and base. The base has 2 neoprene grommets and a U shaped entrance for a 1⅛" prenotched galvanized U cable guard, or a standard 1⅛" guard plus guard adapter.

Reliable

A Symbol of Integrity Since 1909

ELECTRIC COMPANY

Franklin Park, Illinois

Concluded from page 26

jor computer centers to converse directly in computer language with smaller devices in satellite locations.

It speeds information from the smaller units located considerable distances away, smoothing the center's processing load. This slices down-time at the central location, permits maximum utilization of the larger computers and makes the center more productive.

High speed data handling is facilitated by transmitting information on high speed magnetic tape directly from remote locations to central computer facilities for rapid processing rather than being carried by messenger or mailed.

Initial applications will employ microwave radio as the transmission relay media, making installation economical for short distances or for several hundred miles. TDS-90 also may be used with common carrier facilities.

Regardless of whether private microwave or leased common carrier transmission is used, TDS-90 requires a relatively narrow bandwidth. For example, 25,000 characters per second can be tranmitted using only 240 kc of bandwidth.

The TDS-90 equipment is designed with full duplex capability, allowing a simultaneous two-way flow of data from peripheral computers to the center and return. This has the effect of putting a high capacity computer virtually in the same room with smaller units.

In many cases, substantial savings in total monthly rental charges can be realized if data is transmitted from a small satellite computer or remote data source to a central processing center. With a transmission link, the capabilities of the computer are at the disposal of remote locations and can be used without duplicating costly high-capacity data processing and computing functions.

The TDS-90 accepts asynchronous signals from a magentic tape unit, prepares these signals for transmission and modulates them onto the baseband of a microwave or coaxial cable transmission facility. The TDS-90 receive equipment demodulates the signals, recovers signal energy and shapes it into data suitable for transfer to the computer.

Control signals, necessary for the operation and control of a tape unit, are encoded and transmitted via the data channel. Modulation and demodulation are performed with advanced data communication techniques. Synchronous phase modulation and coherent detection give the user maximum reliable recovery of the transmitted signals and freedom from transmission errors, it is said.

•

Return Loss Test Set (Fig. 11). The return loss test set, a product of Communication Equipment & Engineering Co., is a test hybrid mounted in a portable case and supplied with terminals connecting an external oscillator, meter, test standard and test line. The test standard terminals are bridged with a socket which permit the C115 type precision balancing networks to be plugged in.

Complete instructions for making structural return loss, DDD office balancing, and Dial TWX loop return loss tests are furnished with each set. Included in the instructions is also a brief discussion of return loss theory and measurement. The C115 networks are available for H44, H88, D56, and D88 loading.

Story of Life

It is poor heart, and a poorer age, that cannot accept the conditions of life with some heroic readiness.—ROBERT LOUIS STEVENSON.

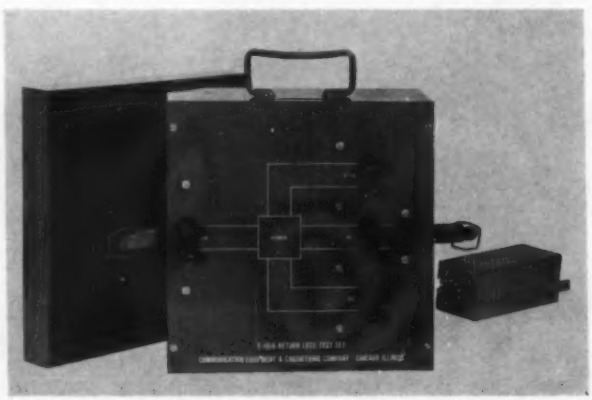


Fig 11. Return loss test set.

Officers Named By AT&T For Long Lines

James R. Rae was named June 1 assistant vice president-engineering of the Long Lines department of the American Telephone & Telegraph Co.

R. Barlet Bradshaw, assistant vice president, currently on special assignment, was appointed assistant vice president-administration.

L. E. Eastmond, administrator of rates and tariffs, was appointed to Mr. Rae's post as assistant vice president in charge of the Long Lines operating staff. These changes in organization become effective June 1.

Mr. Rae, a graduate of the Massachusetts Institute of Technology, joined the Long Lines department in 1929. He became chief engineer in 1958, and assistant vice president, operating staff in 1961.

Mr. Bradshaw, a native of Chicago and a graduate of Princeton University, has been with the Bell System since 1922.

Mr. Eastmond joined Long Lines after graduation from Rutgers University in 1936. He held various positions in the plant, commercial and regulatory departments before assignment to the marketing group as rates and tariffs administrator in 1960.

Mrs. Farrar Gets New Job At Northern Ohio Company

Mrs. Ila M. Farrar has been appointed staff assistant in the traffic department of the Northern Ohio

MRS. FARRAR

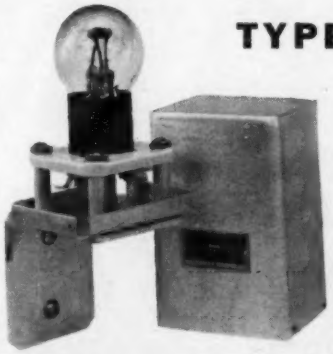
Telephone Co., reporting to J. L. Parker, general traffic superintendent.

Mrs. Farrar began her telephone career in 1942 at Medina, O. For the past eight years, she has been chief operator at Wellington.

Gas filled tubes discharge high voltages much faster than conventional carbon blocks — ten times faster than air gaps — and discharge both sides of the pair at the same instant, preventing build-up and damage to equipment and insulation.

TYPE 167-B For Carrier Terminals

A panel-type unit which protects carrier terminals, their band pass filters, and other equipment from excessive voltage on the carrier line, the power line, or both. Consists of two plug-in type tubes, two 6-amp auto-reset circuit breakers, terminal strips, protected power outlet, and convenience outlet. If lightning or a power surge loads both power and telephone lines at the same instant, each tube discharges its respective line, with the circuit breakers also serving the power line. These circuit breakers also prevent follow-up arcs from normal current, eliminating expensive fuse replacement trips. Tubes are of 300-500 volt breakdown, will serve for years without maintenance. In that time, only a direct hit or near miss will be cause for replacement. For both remote and central office carrier terminals. The units mount on standard 19″ racks, are 3½ inches high.



TYPE 167X1

For Telephone Lines

Single-tube, single-pair protector of carrier line filters, impedance matching transformers, and similar equipment connected to open wire lines; also the drop side of subscriber carrier terminals. Uses plug-in type 300-500 volt tube. For easy bracket mounting, with snap-on weatherproof cover, fully insulated leads.

Write or call for information or Bulletin 259-C

BUCKEYE TELEPHONE & SUPPLY CO.

1250 Kinnear Road Columbus 21, Ohio

Telephone — HUdson 8-0655 (Area Code 614)

ANTICIPATES communications network FAILURE!

Radiation's Telegraph Distortion Measurement System pinpoints potential trouble spots without interrupting traffic.

Even the non-technical operator can use this compact, self-contained system for continuous on-line monitoring of wire or radio telegraph and data links.

TDMS also—transmits perfect test signals—induces predetermined distortion—measures up to 50% signal distortion—permits adjustment of relays during operation — tests start-stop mechanisms — pictures line conditions and analyzes signal waveform, and can replace most teleprinter terminal maintenance and monitoring equipment.

Accessories include: Rack-mount; utility cart (pictured above); portable power supply; and relay-test adapter.

TDMS can cut operating cost and increase the efficiency of your communications network. Write for detailed data, Dept. T-60, Radiation at Orlando, 5800 McCoy Road, Orlando, Fla.

RADIATION Orlando

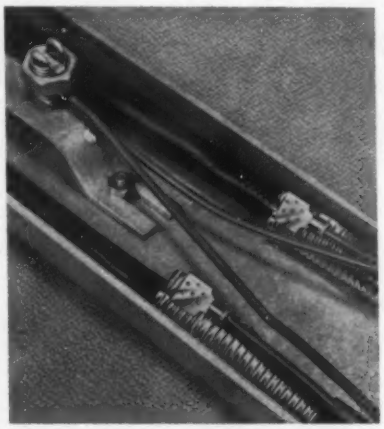
A Division of Radiation Incorporated

News on New Products

Editor's Note: **Data on the products described below were received after Mr. Blain's article on new developments, appearing in this issue, was prepared.**

THE TERMI-FOIL TERMINAL—A device that will meet an important need of long standing in the telephone field has been developed and is being placed on the market by AMP Incorporated of Harrisburg, Pa. This device, identified as the Termi-Foil terminal is for use in connecting either a solid or stranded wire to a copper or aluminum corrugated shield on plastic-jacketed cable.

The shield of plastic cable must be grounded at certain intervals to provide adequate electrical protection. This shield must also be made con-



tinuous over splices, terminals, load coil points, etc. Connecting a heavy ground wire to this thin corrugated metal shield has always proved to be an extremely difficult operation. A soldered connection requires unlimited time and patience and even when made by a skilled workman often proves unsatisfactory. Clamps are easy to install although, usually, after having been in service for a period of time, develop into a high resistance and noisy connection.

In order to overcome these difficulties, AMP has developed a simple and effective method of terminating the ground wire on the cable shield by the use of the Termi-Foil terminal. The surface of this terminal consists of a number of sharp lances or projections. When the copper or aluminum cable shield is pressed into the terminal by flat surface dies, the lances first pierce the metal shield and then fold over. This action securely rivets the shield to the surface of the terminal. The lances also become work hardened and thereby add to the security of the connection. The permanence of these connections has been proved by extensive laboratory tests.

This method provides a voidless hermetically sealed connection that prevents the entrance of moisture of the air and the formation of oxide on the surfaces. The Termi-Foil Connector is made of tin-plated copper, controlled in temper and strength to maintain the pressure of the union and thereby hold a permanent and reliable contact. The terminal body can be designed with a barrel or a tongue on either end, permitting the use of a standard AMP Incorporated wire termination.

This terminal will be furnished with various types of bonding wire harness as required to meet all approved construction practices. The Termi-Foil connector also has REA approval and

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Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP1928_____; **NP1929**_____; **NP1930**_____; **NP1931**_____.

Name .....

Company .....

Street .....

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6/16/62

N-S Copperply® Wire . . .

Special 080-25 Copperply has 47% greater strength than Extra High Strength copper/steel wire, ends service outages due to falling trees, reducing maintenance and inspection costs. Copper coating permits carrier circuits and insulation guards against overgrown brush and corrosive atmosphere. Thousands of pounds of REA-approved 080-25 are now in service on extra long spans, joint pole and other high-strength uses. Write N-S for details.

62-15

NS NATIONAL STANDARD COMPANY

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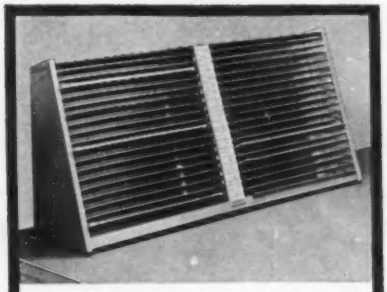

Trouble Recorder Card Rack

For fast orderly sorting of Trouble Recorder cards, has 38 card slots in two banks with index strip between. Base is 38" by 8". Height 15". No. D-30325-1.

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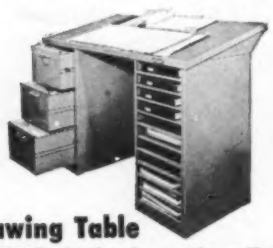
to lighten your work and improve efficiency

Work Bench

For repair, assembly, test and paper work. Top drawer divided into 24 compartments for parts and tools. Large file drawers are for circuit drawings. 54" x 25" top covered with masonite. Height 36". Drawers may be inserted from back to reverse position of knee hole. No. D29978-3.



Drawing Table

For circuit drawing in crossbar offices, provides central location for reference material. Masonite top is 30" x 60". Height 36" at front, 42" at rear. Three large file drawers at left for drawings. Eleven shelves at right are 2½" high, 14" wide, 18" deep for sketches, sequence charts, book type SD sheets, trunk serials, etc. No. D30326-1.

Color of all units: Baked-on gray enamel unless otherwise specified.

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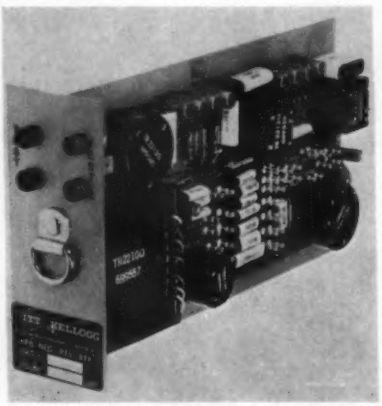
its use is described in "Telephone System Construction Contract" (Labor and Materials), U. S. Department of Agriculture, Rural Electrification, REA Form 511. This book may be purchased for $2.25 from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Request NP1928.

•

NEGATIVE RESISTANCE REPEATER—A transistorized negative resistance voice frequency repeater has been designed by the transmission products department of ITT Kellogg, Raleigh, N. C. Designed for application in loaded cable trunk facilities, the KE-6 type repeater features high gain and a simple alignment pro-



cedure among its major advantages. The company says these are made possible by use of impedance compensator type line build out (LBO) units to match the line impedance to the resistive series-shunt gain unit. After selection and adjustment of the LBO units, repeater gain may be increased or decreased by simple selection of fixed resistors.

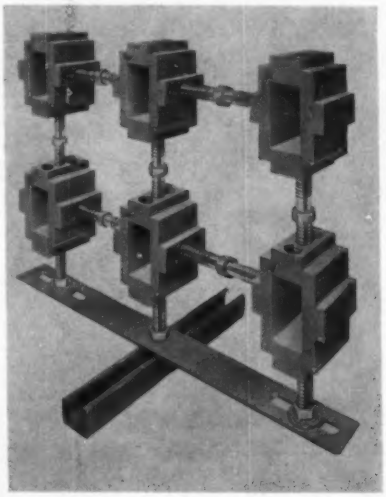
Options for both H88 and D66 loaded cable facilities are available. Also available are two versions of a low cost test set for structural return loss measurements, alignment and maintenance of the KE-6 negative resistance repeater. A sweep oscilator and detector are built into one version. The other version can be used with an external oscilator and detector. Request NP1929.

•

WAVEGUIDE HOLDER—A microwave waveguide holder has been designed by Armo-Strut. The unit is assembled by the use of keys, and slides together, thus eliminating the use of small bolts, nuts, and washers.

The waveguide is made of rubber base phenolic which is said to withstand atmospheric gases, acts as an insulator, has a wide range of temperature variations, and eliminates the necessity of rubber tapping.

According to Armo-Strut, this unit

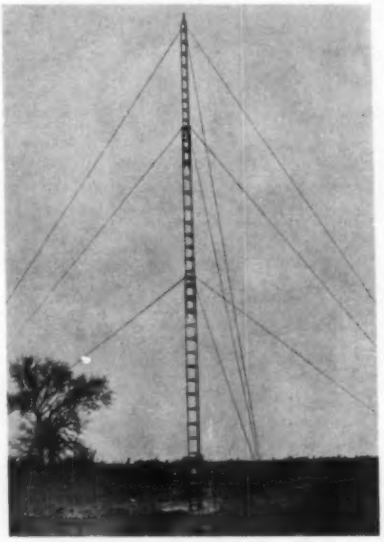


can be installed in seconds thus reducing the cost of microwave installation and making the product relatively inexpensive. Request NP1930.

•

"CRANK-UP" TOWER—The Rohn No. 6 Tower is available as a "crank-up" type in heights from 18 to 54 feet for amateurs and experimenters who desire this type tower.

The tower features a sturdy winch



and cable, which is said to lift the various sections upward with ease and safety. It is available in heights of 18, 26, 37 and 54 feet. The crank-up tower is made of hot dipped galvanized steel and features all the advantages of the well-known Rohn No. 6 Tower. Request NP1931.

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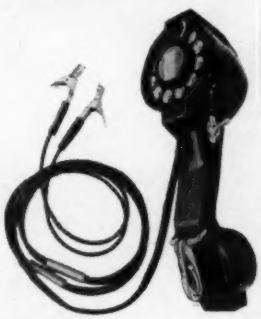

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AE Conducts ETV Seminar For S. C. Companies

Automatic Electric Co. sponsored a seminar on the problems of expanding closed-circuit educational television in South Carolina recently in Columbia. Sessions were attended by local telephone company and equipment manufacturer representatives.

South Carolina's ETV network reaches out to 70 high schools in almost half the counties in the state. Columbia is the broadcasting center for this network.

The South Carolina ETV Commission hopes eventually to expand the network to serve every high school and most elementary schools in the state.

Automatic Electric's ETV seminar was the first to bring together equipment manufacturers and Independent telephone companies to discuss problems of designing and installing an ETV network. Such subjects as equipment, costs, technical concepts, and long-term financing for operating companies were discussed.

South Carolina telephone companies represented were: West Carolina Rural Telephone Cooperative, Horry Telephone Cooperative, St. Matthews Telephone Co., Bowman Telephone Co., Swansea-Wagener Telephone Co., Health Springs Telephone Co., Kershaw Telephone Co., General Telephone Co. of South Carolina, Greenwood Telephone Co., Home Telephone Co., Sandhill Telephone Cooperative, Rock Hill Telephone Co., and the Piedmont Rural Telephone Cooperative.

Equipment manufacturers in attendance included Automatic Electric; the Spencer-Kennedy Laboratories, Boston; General Cable Corp., New York City; and Lenkurt Electric Co., Inc., San Carlos, Cal.

GD/T to Distribute AT&E Channel Multiplexing Unit

Arrangements have been made whereby General Dynamics/Telecommunication will begin distributing and later will manufacture in its Rochester, N. Y., plant, a new type of microwave channel multiplexing equipment now being produced by Automatic Telephone and Electric Co., Ltd., Liverpool, England.

This equipment will be added to GD/T's present line of Stromberg-Carlson transmission equipment for use by telephone companies and right-of-way utlities that maintain their own communications systems.

"This agreement," according to John H. Voss, president of GD/T, "permits expansion into a field for which there is a growing market."

The transmission equipment developed by AT&E provides 600 transmission paths for voice or data, through microwave radio operation. According to GD/T, it meets all requirements of the Consultative Committee for International Telephone and Telegraph (CCITT), ensuring compatibility in communications systems which must inter-connect according to recognized world-wide standards.

It is said to be the most compact

ETV seminar sponsored by Automatic Electric Co. in Columbia, S. C., during a working session. Local telephone and equipment personnel discussed expansion of state's closed-circuit educational TV network.

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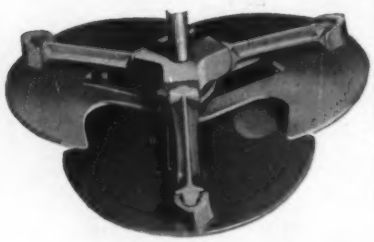

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system, channel for channel, yet devised. The unit measures 4⅛ inches by 4½ inches by 7⅛ inches. Units mount in cabinets 20½ inches wide. A nine-foot rack accommodates 96 channels without signaling or 60 channels with signaling. The cabinets—only 8 13/16 inches deep—may be arranged back-to-back to conserve space.

Units are used in building block fashion to form a variety of systems for open wire, cable, microwave and coaxial cable. Open wire systems can be installed in groups of three chan-

Edward J. McGuinness, transmission products sales manager for GD/T, left, holds a channel multiplexing unit and discusses it with Henry G. Kidner, manager of transmission sales for AT&E.

nels, or as an initial 12-channel capacity system. A cable system can be provided for up to 24-channel capacity. Radio systems are available in up to 600-channel capacity, and coaxial systems for 300 channels.

The modular concept makes it practical to install the system when there is a requirement for only a few channels. It is then expandable to meet future growth at any time.

The design employs solid state circuitry, card mounting of components, and printed wiring boards. Many of the plug-in units are interchangeable. The basic unit is designed so its component cards may be opened and spread out like the pages of a book for easier servicing.

AT&E was founded 50 years ago and has 13 manufacturing units in Great Britain and interest in factories in Australia, Portugal, South Africa, and Brazil. It is the largest organization in the British Commonwealth principally engaged in manufacuring telecommunication equipment.

GD/T, through this agreement, will have exclusive rights to manufacture and distribute AT&E transmission equipment in the United States, and to participate in its distribution throughout the Western Hemisphere.

Bruce G. Merritt Joins C & D Batteries

Bruce G. Merritt has joined the sales organization on C & D Batteries, division of Electric Autolite Co. Merritt is associated with Duke-Philibert and Co., C & D's New Orleans representative. Henry E. Jensen, vice president of C & D, announced the appointment.

C & D manufactures industrial storage batteries to power electric trucks and other industrial applications. The company's sales and service offices are located in principal cities across the country.

Prior to joining C & D, Merritt was with Woodward-Wight and Co.

Recordak Names Macdonald to New Post

Alfred J. Macdonald has been promoted to director of sales administration of Recordak Corp.

Since 1953 Mr. Macdonald has been division sales manager for the northeastern states which are served by Recordak branches in Boston, New York, Rochester, Phildelphia, Baltimore and Washington. He had previously held a similar position as midwestern division sales manager, and had also been branch manager at

A. J MACDONALD

Boston, Washington, and Chicago. In his new post he will have administrative responsibility for nationwide field sales activities which are conducted through the Recordak Branch Organization in 38 cities.

A native of Cincinnati, Macdonald resigned a position as manager of the transit department of the First National Bank of Portland, Ore., to join Recordak as a salesman in 1931. After an indoctrination course, he was as-

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signed a large territory covering the New York suburban areas, and was promoted to branch manager at Boston in 1932.

Name Roe Chairman Mid-Atlantic, Electronic Assn.

J. Robert Roe, vice president and general sales manager of Airtron, a division of Litton Industries, has been appointed assistant chairman of the Middle Atlantic States section of Electronic Industries Association, waveguide and component sub-section.

Mr. Roe joined Airtron in 1960 as product manager, microwave components, and was promoted to his present position in 1961.

J. R. ROE

Prior to his association with Airtron, he was with ITT Kellogg, where he was responsible for the company's sales activities in 13 southern states. He also held a number of other sales and management posts with ITT Kellogg.

An electrical engineering graduate of Iowa State University, Mr. Roe served during World War II with the Signal Corps and Military Intelligence division, active in the areas of radar and electronic counter-measures programs.

Free State Equipment Co. Named Parsons Distributors

Free State Equipment Co., Inc., Baltimore, has been appointed distributor for most of Delaware and Maryland, all of D. C., and adjoining counties in West Virginia and Virginia.

Free State will sell and service the complete line of Parsons Trenchliners which includes small models used in utility trenching to the large machines used to excavate big cross-country pipeline ditches.

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At division level, supervise and coordinate sales engineering activities associated with our expansion into the field of voice communications. Positions are available in New York City, Chicago, San Francisco, Atlanta and Dallas. A minimum of 2 years experience in telephone services is required. Salary to $9,500. Resumes to Western Union, Room 2111, 60 Hudson St., N.Y.C. Attn: Mr. W. P. Romano

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900	Jack, Lamp, Stromberg-Carlson, #121 on #83 Mtg. 20 per	(New)
200	Jack, Lamp, Stomberg-Carlson, #121 on #89 Mtg. 10 per	(New)
900	Jack, Lamp, Stromberg-Carlson, #121 on #80 Mtg. 10 per	(Recond.)
250	Jack, Spring, Stromberg-Carlson, #127 on #89 Mtg. 10 per	(New)
1,100	Jack, Spring, Stromberg-Carlson, #127 on #90 Mtg. 20 per	(New)
65	Jack, Spring, Stromberg-Carlson #128 on #97 Mtg. 10 per	(New)
200	Jack, Spring, Stromberg-Carlson, #130 on #99 Mtg. 10 per	(Recond.)
500	Jack, Spring, Stromberg-Carlson, #135 on #80 Mtg. 10 per	(New)
75	Key Box, Stromberg-Carlson, #13 (3-Way)	(Recond.)
1,000	Lamp Socket, Individual Type S.C. #601869 (Eq. to W.E. #49-A)	(New)
16,000	Lamp, Switchboard, S.C. #24-B-2 (24 Volt) 100 per Box	(New)
400	Ringer, Stromberg-Carlson #61-A Straight Line, 1800 ohm	(New)
12	Telephone, Stromberg-Carlson #1248 Magneto Desk	(Recond.)

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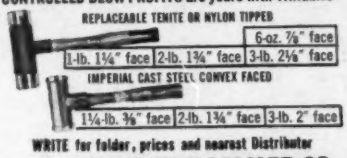

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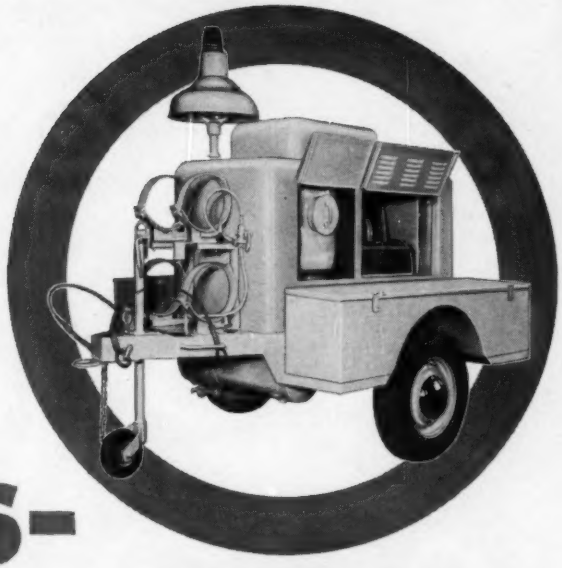

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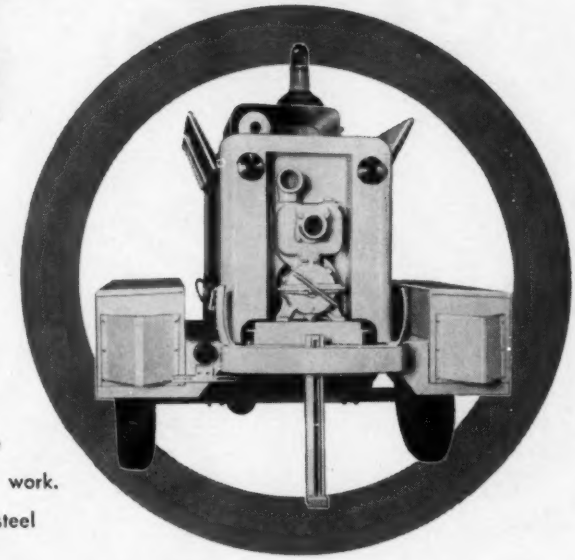

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